

TC
425
M45
M84

Cornell University Library

TC 425.M45M84

The Miami Valley and the 1913 flood,



3 1924 004 454 470

enr



Cornell University Library

The original of this book is in
the Cornell University Library.

There are no known copyright restrictions in
the United States on the use of the text.

STATE OF OHIO
THE MIAMI CONSERVANCY DISTRICT

The Miami Valley and the 1913 Flood

by

ARTHUR E. MORGAN

Chief Engineer

TECHNICAL REPORTS

Part I

DAYTON, OHIO
1917



STATE OF OHIO

THE MIAMI CONSERVANCY DISTRICT

The Miami Valley and the 1913 Flood

by

ARTHUR E. MORGAN

Chief Engineer

TECHNICAL REPORTS

Part I

DAYTON, OHIO

1917



Engineering
TC
425
MYS
M84

THE MIAMI CONSERVANCY DISTRICT
DAYTON, OHIO

EDWARD A. DEEDS, Dayton
Chairman

HENRY M. ALLEN, Troy

GORDON S. RENTSCHLER, Hamilton

Board
of
Directors

EZRA M. KUHNS, Secretary

OREN BRITT BROWN, Attorney

JOHN A. McMAHON, Counsel

ARTHUR E. MORGAN, Chief Engineer

CHAS. H. PAUL, Ass't Chief Engineer

002/38
C4P

PREFATORY NOTE

This volume is the first of a series of reports, all of the others being of a technical nature, issued in connection with the planning and execution of a notable system of flood protection works in the Miami Valley in southwestern Ohio.

From the great flood of March, 1913, which destroyed in the Miami Valley alone over 360 lives and probably more than 100 million dollars of property, there resulted an energetic movement to prevent such a recurrence. This movement developed gradually into a great cooperative enterprise for the protection of the valley by one comprehensive project. The Miami Conservancy District, established in June, 1915, under the newly enacted Conservancy Law of Ohio, became the agency for securing this protection. On account of the unusual size and character of the undertaking, the plans of the district have been developed with more than usual care.

A Report of the Chief Engineer, submitting a plan for the protection of the district from flood damage, was printed March, 1916, in 3 volumes of about 200 pages each. Volume I contains a synopsis of the data on which the plan is based, a description of its development, and a statement of the plan in detail. Volume II contains a legal description of all lands affected by the plan. Volume III contains the contract forms, specifications, and estimates of quantities and cost.

After various slight modifications this report of the Chief Engineer was adopted by the Board of Directors as the Official Plan of the District and was republished in May, 1916.

In order to plan the project intelligently, many thorough investigations and researches had to be carried out, the results of which have proved of great value to the district, and which will also be of widespread value to the whole engineering profession. It is the object of this series of Technical Reports to make available to the residents of the state and to the technical world at large, all data of interest relating to the history, investigations, design and construction of the project.

The following reports have been completed:

Part I.—The Miami Valley and the 1913 flood.

Part II.—History of the Miami flood control project.

Part III.—(a) Theory of the hydraulic jump and backwater curves.

(b) The hydraulic jump as a means of dissipating energy.

Part IV.—Calculation of flow in open channels.

Part V.—Storm rainfall of eastern United States.

The following are in the course of preparation:

Rainfall and runoff in the Miami Valley.

Laws relating to flood prevention work.

Flood prevention works in other localities.

Earth dams.

Selection of general type of improvement and design of retarding basin system.

Construction of protection system.

Contracts and specifications.

The most significant aspect of this undertaking cannot be covered in any technical report. For it was the spirit of the community, no less than careful planning, which made possible the final success of the undertaking. Immediately after the flood 23,000 of the people of Dayton subscribed a fund of more than \$2,000,000 to be used to promote flood protection. When the integrity of the Conservancy Law was endangered in the state legislature, in three days' time a petition was signed by 87,000 of the inhabitants of the district, out of a total population of 250,000, asking that the law be allowed to stand. In the development of the district's plans, the time, money, and interests of the business men of the valley have been freely offered. A very large proportion of these men of largest interests, at some time or other during the progress of the work, have for varying periods of a few days or weeks to more than a year at a time, practically laid aside their private interests, and have given themselves entirely and without compensation to the work of the district. Very commonly the expenses incurred during the performance of these services were paid by these men personally, and were not charged to the flood prevention fund. These are but typical illustrations of a spirit that has been in evidence from the beginning.

The Miami Conservancy District is notable because of its engineering features; but it is none the less notable as an example of social cooperation. To be associated with this undertaking and with the people who have supported it so loyally, has been a rare privilege, keenly appreciated by the members of the engineering staff of the district.

ARTHUR E. MORGAN,
Chief Engineer.

Dayton, Ohio, October, 1917.

CONTENTS

	Page
OFFICERS OF THE MIAMI CONSERVANCY DISTRICT	4
PREFATORY NOTE	5
CONTENTS	7
LIST OF ILLUSTRATIONS.....	8
GEOLOGY	11
CLIMATE	13
SETTLEMENT OF THE MIAMI VALLEY.....	14
POPULATION AND INDUSTRIES.....	18
FLOODS IN THE MIAMI VALLEY.....	21
THE FLOOD OF 1913.....	29
Weather immediately preceding the flood.....	30
Rainfall causing the flood.....	31
The day before the flood.....	39
The flood at Piqua.....	40
The flood at Troy.....	43
The flood at Dayton.....	46
Fred Boyer's account.....	51
Bertha Langstroth's account.....	52
H. W. Lindsay's account.....	54
Dr. J. C. Reeve's letter.....	59
Bell telephone employee's account.....	63
The flood at Hamilton	66
THE PASSING OF THE FLOOD.....	69
Gen. George H. Wood's report.....	72
Col. Chas. X. Zimmerman's report.....	95
Gen. John C. Speaks' report.....	99
THE STATE RESERVOIRS DURING THE FLOOD.....	109
THE EFFECTS OF THE 1913 FLOOD.....	113
Summary of flood losses in Miami Valley.....	117

LIST OF ILLUSTRATIONS

Figure	Page
1.—Map of the Miami River drainage area showing location of proposed retarding basins.....	10
2.—Indian Mound near Miamisburg.....	15
3.—Five methods of transportation in the Miami Valley.....	19
4.—View of Miami River below Dayton.....	22
5.—Maximum Miami River stages of 11 feet and above, at Dayton.....	28
6.—Rainfall map of Miami drainage area for March 23, 1913.....	33
7.—Rainfall map of Miami drainage area for March 24, 1913.....	34
8.—Rainfall map of Miami drainage area for March 25, 1913.....	35
9.—Rainfall map of Miami drainage area for March 26, 1913.....	36
10.—Rainfall map of Miami drainage area for March 27, 1913.....	37
11.—Cumulated rainfall map of Miami drainage area for March 23-27, 1913	38
12.—East Piqua (Shawnee) during the flood.....	41
13.—Cottages were moved off their foundations.....	42
14.—The court house at Troy during the flood.....	44
15.—Second Street, Dayton, after the waters began to subside.....	47
16.—Distinct high water marks were left by the receding waters.....	49
17.—A glimpse of the National Cash Register factory buildings, Dayton	50
18.—Damaged cottages in Dayton.....	53
19.—Remains of O. G. Saettel's grocery, Vine and Main Streets, Dayton	57
20.—Rising flood at Dayton, March 25, 1913, Fourth and Ludlow Streets	60
21.—Miles of telephone lines were destroyed.....	64
22.—High Street, Hamilton, at day break March 26, 1913.....	67
23.—Diagram showing the rise and fall of the Miami River at Dayton and at Hamilton during the flood of March, 1913.....	70
24.—Morgue at factory of National Cash Register Company.....	71
25.—Bridge over Miami and Erie Canal in Dayton covered with flood wreckage	73
26.—The burnt section of the Dayton business district.....	75

Figure	Page
27.—Mud and stocks of goods being shoveled out of stores and hauled away	77
28.—Dead horses at Ludlow and Second Streets, Dayton.....	81
29.—Bread line in Dayton at the factory of the National Cash Register Company	83
30.—Passage way cleared through street obstructed with debris.....	86
31.—Gravel deposits on some streets were several feet deep.....	89
32.—Manufacturing plants suffered heavily.....	94
33.—Substantial pavements were completely destroyed.....	97
34.—Debris from lumber yard and wrecked cottages, Taylor Street, Dayton	102
35.—Flood wreckage piled on roofs of houses.....	107
36.—Downstream view of outlets of Lewiston Reservoir.....	110
37.—Downstream view of spillway of Loramie Reservoir.....	112
38.—An aisle in the Dayton Public Library after the flood.....	114
39.—Tons of mud were shoveled out of houses.....	115
40.—Asphalt pavement destroyed by flood on Ludlow Street, Dayton....	116
41.—Farm lands ruined by flood.....	119
42.—Where a hedge or fence checked the current, sand was deposited in great heaps	120
43.—Great banks of gravel were deposited over farm lands.....	123
44.—Entire farms were so covered with gravel as to be useless.....	124

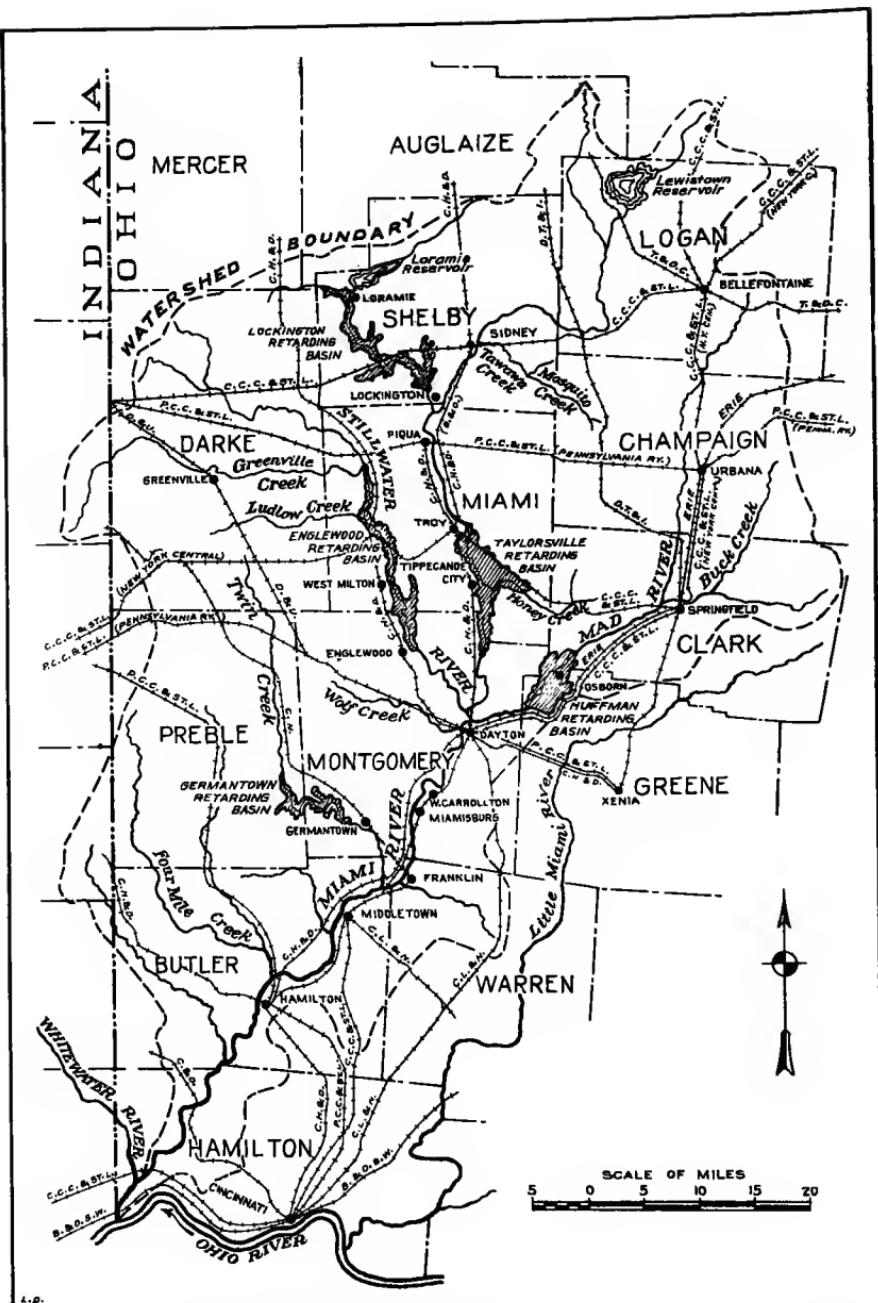


FIG. 1.—MAP OF THE MIAMI RIVER DRAINAGE AREA SHOWING LOCATION OF PROPOSED RETARDING BASINS.

The lower Miami and Mad Rivers lie along the easterly margins of their drainage areas at the foot of a ridge that extends unbroken from the Ohio River to Springfield, except at a single point a few miles above Dayton, where a depression in the ridge marks a preglacial course of the Miami River across the present course of Mad River. Nearly all tributaries enter the main river from the west.

THE MIAMI VALLEY AND THE 1913 FLOOD

One can better appreciate the significance of the great flood of 1913 if he has in mind the characteristic features of the Miami Valley, and of its development.

When the boundaries of Ohio were being fixed, the mouth of the Miami River was determined upon as the southwest corner of the state. From this point the river extends northeasterly, as shown in figure 1, having its source in Logan County, just west of the center of the state. With its tributaries it drains 5430 square miles in southwestern Ohio and southeastern Indiana. The Miami Valley is about 120 miles long, and varies in width from a quarter of a mile to three miles. It appears as a flat plain fifty to two hundred feet below the general elevation of the adjacent rolling country. The river itself, winding back and forth across this flat valley, has a total length of 163 miles.

Of the tributaries from the west, the largest is the Whitewater River, draining 1480 square miles in Indiana, and emptying into the Miami so near its mouth as almost to constitute a separate river system. Following northward up the west side of the river we come to Indian Creek a few miles below Hamilton, Four Mile Creek, a flashy stream entering at Hamilton, and Twin Creek with its outlet just below Franklin. Four streams, the Miami, Mad, Stillwater Rivers and Wolf Creek unite within the city limits of Dayton, and at Piqua, 27 miles north of Dayton, the Miami is joined by Loramie Creek.

GEOLOGY

The Miami Valley gives evidence of very old geological formations. Its layers of limestone, shale, and clay, many hundreds of feet thick, were deposited on an ocean bed during those early geologic periods known as the Ordovician and Silurian, when the highest forms of life were shellfish, crustaceans, and primitive fish like animals. In the limestone rocks of the region are numberless fossils of brachiopods, corals, trilobites, and other forms of marine life of that early time. The various formations are classified as follows:

SOUTHWESTERN OHIO GEOLOGICAL SCALE

			Cedarville
			Springfield
			Euphemia
			Laurel
	Niagaran	Lockport	
Silurian		Clinton	West Union*
			Osgood (Niagara Shale)
			Dayton
	Medinan	Albion	Brassfield (Ohio Clinton)
			Elkhorn
			Whitewater
			Saluda*
			Liberty
			Waynesville
			Arnheim
Ordovician	Cincinnatian	Richmond	
		Maysville	
		Eden	
	Mohawkian	Trenton	

NOTE.—* Indicates formation not found locally.

() Indicates name frequently used locally.

Long ages later, just before the period of the glaciers, the surface of southwestern Ohio probably was similar to the present surface of northeastern Kentucky. High, narrow, and steep ridges alternated with deep gullies. The top soil had been so thoroughly leached out by rain that it was not very fertile. Just as the present surface of northeastern Kentucky, made up of these deep gullies and steep hillsides, is not well adapted to agriculture, so southwestern Ohio in that preglacial time, would have been a poor farming region. Then came the age of the glaciers, when a great cap of ice, covering the polar regions and creeping slowly as do the Alaskan glaciers of today, flowed toward the south, reaching at one time approximately to the Ohio River. This great ice sheet, many thousands of feet thick, slowly but resistlessly dug out the basins of the Great Lakes, ground down the hill tops, filled the river valleys, and greatly changed the appearance of the region which is now the Miami Valley. The lowering of the hill tops, the filling of the valleys, and the grinding up of the limestone rock which now forms our fertile soil, all served to endow the region with just the qualities needed for agriculture; but this same action helped to create conditions which make disastrous floods possible on the streams of southern Ohio and Indiana.

The ice age did not end suddenly. There were warm periods when the glaciers retreated many miles to the north, or wholly disappeared; and then again, with a change to a colder era, they would push forward, regaining some of their lost ground. But when throughout a long period the general tendency was toward a warmer climate, each advance of the ice sheet fell short of the last, until now it has retreated to Greenland, Alaska, and the polar is-

lands. During an advance the irregular, protruding ends of the glaciers pushed to the sides and ahead of them great accumulations of boulders, gravel, and powdered rock, now known as moraines. Following the line of least resistance toward the south, the glaciers scoured deeper and wider the river channels through the limestone hills, channels which in many cases were wholly or partially filled again with ground-up rock and gravel as the ice retreated.

These alternate advances and retreats did not always follow the same paths. A river valley enlarged by one glacial advance, and by water from the melting ice during its retreat, would be filled up and perhaps obliterated by a later advance from another direction. Thus it appears that the Miami River at one time flowed south through the valley of Mosquito Creek, near Sidney, and into the Mad River; and that at another time it ran southeasterly along the present course of Honey Creek, north of Dayton, through a valley that was later obliterated by glacial drift, across the Mad River valley near Osborn, and into the Little Miami.

It was the work of these glaciers in digging out and partially filling again the valleys carved in the limestone rock, and in piling up great mounds of drift along their sides, which has left the valleys of the Miami River and its tributaries susceptible to frequent flooding, but also with unusually favorable locations for the construction of reservoirs or retarding basins.

The present Miami River is a puny descendant of the glaciers that dug great gorges through the limestone rock, and of the mighty river formed by the melting of the ice sheet. It wanders aimlessly back and forth through what we choose to call its valley, a mere thread of a stream that has dug for itself a narrow channel in the half obliterated bed of its great ancestor. At only a few times during a century, when a rare combination of the elements results in most unusual rainfall, does the river again for a few brief hours fill its prehistoric banks and rise to the measure of its ancient majesty. Whether the long glacial epoch is finally ended, or whether the present age is simply an interval between two of the repeated advances of the great ice sheet, we do not know. Recorded history covers too short a period to furnish a measure of these slow changes. The gradual shifting of great centers of civilization from the tropics toward the northern latitudes during thousands of years is a faint indication of gradual changes toward a warmer climate.

CLIMATE

As a result of its geographical situation, the climate of Ohio tends to be a favorable mean between those extreme variations which prevail along the borders of the country, east and west, north and south.

Sunshine, rainfall, and temperature are controlling factors in the development of a country; not only by determining the growth of agricultural products, but, of perhaps greater import, by their influence upon the energies of men and upon the varied and manifold activities which unite to constitute a modern complex civilization.

It means much to the destiny of Ohio that her climate is closely similar to that of the very limited portions of the north temperate zone which have produced the greatest modern civilizations. In the latitude of Ohio, the ideal rainfall for agriculture is from 35 to 45 inches annually, distributed fairly uniformly throughout the crop growing season. Rainfall in the Miami Valley closely approximates these conditions, and, combined with about 240 days with sunshine during the average year, insures a generally high average production of crops. The mean summer temperature is about 74 degrees Fahrenheit, on unusually hot days reaching 100 degrees. The mean winter temperature is about 31 degrees, 10 or more degrees below zero being occasionally recorded.

By reason of its central location this region avoids the raw humid winds of the Atlantic seaboard, the disastrous tropical hurricanes of the Gulf coast, the arid conditions of the western plains, and the extreme cold of the northern winters. Average summer temperatures are five or ten degrees higher than those which would give the maximum of physical comfort and efficiency. There is sufficient annual range of temperature to produce to perfection most of the temperate zone crops, and to obtain in high degree the tonic effect on the health of a considerable seasonal change of weather.

The storms which occur over the eastern United States move across the country in a general direction from west to east. They usually avoid crossing mountains, and hence in this locality generally move in a northeasterly direction somewhat parallel to the Appalachian Mountains. On this account an unusual number cross the state of Ohio. Not only do we have storms coming from the west and northwest but also many that come up from the southwest follow the general direction of the Ohio River valley. The frequency of storms together with the rolling nature of the topography which conduces to a rapid rate of storm runoff, naturally subject this region to more extreme flood conditions than exist in much of the region to the north and east.

SETTLEMENT OF THE MIAMI VALLEY*

Throughout the Miami Valley are numerous mounds and embankments marking the occupation of the country by a prehistoric people, commonly known as the Mound Builders. (See figure 2.) Whether these were a separate race of people, or simply some of the many tribes of Indians which from time to time displaced each other in possession of the country, we do not know. The remains of arrow heads and pottery they left behind do not indicate a culture much in advance of that of the later Indians. When the valley first became known to white men it was in control of a number of tribes belonging to the Algonquian family, the Miamis or Tightwees, who had immigrated from Michigan, being in control of the

* The data for these notes is taken from: "Sketch of the History of Dayton," by M. E. Curwen, 1850; Edgar's "Pioneer Life in Dayton and Vicinity," 1896; Steele's "Early Dayton," 1895; Crew's "History of Dayton," 1889; and from the publications of the Ohio Archaeological and Historical Society.

confederation. "Miami" is an Indian name signifying "mother." The group of Miami villages, on the present site of Piqua, at one time had about six thousand inhabitants, and was one of the most important Indian settlements east of the Mississippi. About 1740 the Shawnees, moving north from Florida, joined this group.



FIG. 2.—INDIAN MOUND NEAR MIAMISBURG.

This prehistoric structure is one of a number of earth mounds built by Indians or Mound Builders. Its sides, after centuries of weathering without care, still are steeper than those of the proposed earth dams of the Miami Conservancy District.

In 1751 an Englishman named Gist visited the villages of the Tightwee or Miami Indians at the present site of Piqua, and wrote an account of his journey. A number of white traders were then living in the Piqua villages. He reported that the country abounded

with turkeys, deer, elk, and most sorts of game, particularly buffaloes, thirty or forty of which are frequently seen feeding in one meadow; in short, it wants nothing but cultivation to make it a most delightful country. The land upon the Great Miami is rich, level, and well timbered—some of the finest meadows that can be. The grass here grows to a great height in the clear fields, of which there are a great number, and the bottoms are full of white clover, wild rye, and bluegrass.

According to tradition, as recorded in various histories of Dayton, long before the valley was visited by white men, the country lying between the Great Miami and the Little Miami, bounded on the south by the Ohio and on the north by the Mad River, was kept as a preserve and used only as a hunting ground. It furnished in-

dian war parties as well as indian villages with food, and when the braves were on the warpath, hunters were sent into this preserve for game and fish. Probably there have been no permanent indian dwellings on this land since 1700.

Sometime before 1800 the country was visited by one James Smith, who made his way to the little settlement of Hamilton, thirty-five miles from the mouth of the river. His observations have been preserved.*

Within about 9 or 10 miles of Hamilton, the lands I think are the richest I ever saw. The growth is mostly walnut, sugar trees, etc., tied together by clusters of grapevines, which in this country grow amazingly large. From this to Hamilton is the most beautiful level that ever my eyes beheld; the soil is rich, free from swampy or marshy ground, and the growth mostly hickory.

Near Hamilton we saw several pararas, as they are called. They are large tracts of fine, rich land without trees, and producing as fine grass as the best meadows. From Hamilton, down the Miami valley to the Ohio, the lands exceed description. Indeed this country of all others that ever I saw, seems best calculated for earthly happiness. If you have a desire to raise great quantities of corn, wheat, or other grain, here is perhaps the best soil in the world inviting your industry. If you prefer the raising of cattle or feeding large flocks of sheep, here the beautiful and green parara excites your wonder and claims your attention. If wearied with toil, you seek the bank of the river, as a place of rest, here the fishes sporting in the limpid stream invite you to cast in your hook, and draw forth nourishment for yourself and family. The most excellent fowl perch in the trees and flutter in the waters, while these immense woods produce innumerable quantities of the most excellent venison. Amidst this rich, this pleasing variety, he must be undeserving the name of man, who will want the common comforts of life.

About 1750 the English built a fortified trading post called Pickawillany near the site of the Lockington Dam, this being the first white settlement in Ohio. It was destroyed in 1752 by the French, and all the inhabitants were killed. No other white settlements were made within the limits of the state until after the Revolutionary War. For the next fifty years the ownership of the Miami Valley and of the territory to the northwest was disputed by Spanish, French, British, Indians, and Americans. One after another the claimants were eliminated in the order named above, until about the beginning of the last century the territory became definitely established as a part of the United States, though final rights were not secured from the Indians until several years later. A permanent settlement was first made at Marietta in 1788, and at Cincinnati about a year later.

In July, 1787, Congress authorized the sale of land in the northwest territory in tracts of not less than one million acres. A month later John Cleves Symmes made application for the purchase of the land between the Great Miami and Little Miami Rivers, and im-

* Ohio Archaeological and Historical Society Publications, Volume XVI, page 380.

mediately began selling land. In June, 1789, Benjamin Stites, who first drew Judge Symmes' attention to this region, bought from him for John Stites Gano, William Goforth, and himself "the whole of the seventh range of lands" and immediately prepared plans for a town on the present site of Dayton, to be called Venice. Judge Symmes never completed his purchase from the government, and because of this and of Indian troubles, the undertaking failed.

After General Wayne had decisively defeated the Indians on the Maumee River, and after the resulting treaty of Greenville on August 20, 1795, four men contracted with Judge Symmes for the purchase "of the 7th and 8th ranges between the Miami Rivers." The designation "between the Miami Rivers" is still applied to these lands in legal transfers. The men in this group were General Jonathan Dayton, afterward Senator from New Jersey, General Arthur St. Clair, Governor of the Northwest territory, General James Wilkinson of Wayne's Army, and Colonel Israel Ludlow of New Jersey. They employed Daniel C. Cooper to be their agent. Cooper's first duty was to survey and mark a road from Fort Hamilton to the mouth of Mad River. On November 4, 1795, Israel Ludlow and a party of surveyors laid out a town at the mouth of Mad River, naming it Dayton after Jonathan Dayton. In the Spring of 1796, Cooper, Edgar, and Holt came to Dayton to make it their permanent home. With them were sixteen other men. Cooper built a small cabin on the present site of the Conservancy Building, and Colonel George Newcomb built a log cabin on Monument Avenue, using it until the "finest house in Dayton" could be completed for him at the corner of Main Street and Monument Avenue. This "finest house" was the east end of the log cabin now standing opposite the Conservancy Building on the river bank, and consisted of two rooms. After the west half was added in 1798 the house was so much superior to any other in town that it served for many years as tavern, store, dwelling, courthouse, and jail.

When Judge Symmes failed to complete the purchase of land between the Miami Rivers, Congress passed an act by which anyone who had a contract with him was enabled to purchase a limited amount at two dollars per acre. Daniel C. Cooper purchased several hundred acres, became proprietor of the city, and at once set about to develop water power and in other ways to advance the community. By 1800 he had a saw mill and a grist mill in operation.

The first election in the township of Dayton was held in 1802, the township being then in "Hamilton County, Territory of the United States Northwest of the Ohio River." Dayton township at first covered 6300 square miles, but in 1805 the legislature incorporated the township with approximately its present limits. Ohio was made into a state in 1802, and at the first session of the state legislature in 1803 Hamilton County was divided and Montgomery County formed, including all of the territory of 9 present counties, and parts of 4 others. Dayton was chosen as the county seat. The total receipts from taxation in Montgomery County for the year 1804 were \$373.96. In 1807 Miami County was formed from Montgomery County, leaving Montgomery and Preble counties as one.

In 1810 Cincinnati had a population of 2320, and Dayton 383. The population of Montgomery County in 1810 was 7722, and the receipts from taxes that year were \$1644.

During this early period the Miami River was used for water transportation. One of the parties which came to Dayton in 1796 made the trip from Cincinnati in a boat called a pirogue. The first flat boat to go down the river was launched in 1799, being loaded at Dayton with grain, pelts, and 500 venison hams. It made the trip during the spring freshets and arrived safely at New Orleans. As was the case with other similar ventures, the boat and cargo were sold at New Orleans, the owner returning on horseback. As these traders on the long homeward trail through the forests brought back in their saddle bags the entire proceeds of the voyage, the return trails along the river banks were infested with highwaymen. Tradition has it that these robbers commonly murdered their victims in cold blood, this being the easiest way to prevent knowledge of their crimes from spreading.

The earliest Dayton newspapers which have been preserved show that in 1809 there was much complaint that brush dams and fish baskets were impeding navigation. Conflicts were frequent between boatmen and the owners of dams and fish traps, but water transportation on the river continued until 1829. In March, 1826, a fleet of 30 or more boats went down the river, most of them reaching New Orleans in safety. The last boat to leave Dayton for New Orleans was in February, 1828, though boats were run north to Piqua until 1836.

In 1825 the state legislature passed a law authorizing the construction of a canal from Dayton to Cincinnati. Work was begun in 1825, and the canal was opened to use in January, 1829. The success of the Miami Canal at once created a demand for its extension to Lake Erie. In May, 1828, the National Congress gave to Ohio 500,000 acres of land to be sold at \$2.50 per acre or more for payment of the canal debt. Early in 1830 the state legislature authorized plans and estimates for the extension, and work was begun in 1831. The waterway was opened through from the Ohio River to Lake Erie in 1845. For about 25 years the canal was one of the chief means of transportation, and it contributed very greatly to the development of the Miami Valley. It fell into complete disuse for navigation with the extension of railroads over the state. The accompanying illustration, figure 3, of a location near Miamisburg shows five methods of transportation, by river, highway, canal, electric traction, and steam railroad, running parallel and within a space of 200 feet. The chief contribution of the Miami Valley to the world's methods of transportation, the aeroplane, does not appear in this picture.

POPULATION AND INDUSTRIES

The industries of any community are in effect a development of its raw materials and of its other natural resources. New England industries originated to a large extent with the development of waterpower; Pittsburgh is explained by the occurrence in that lo-

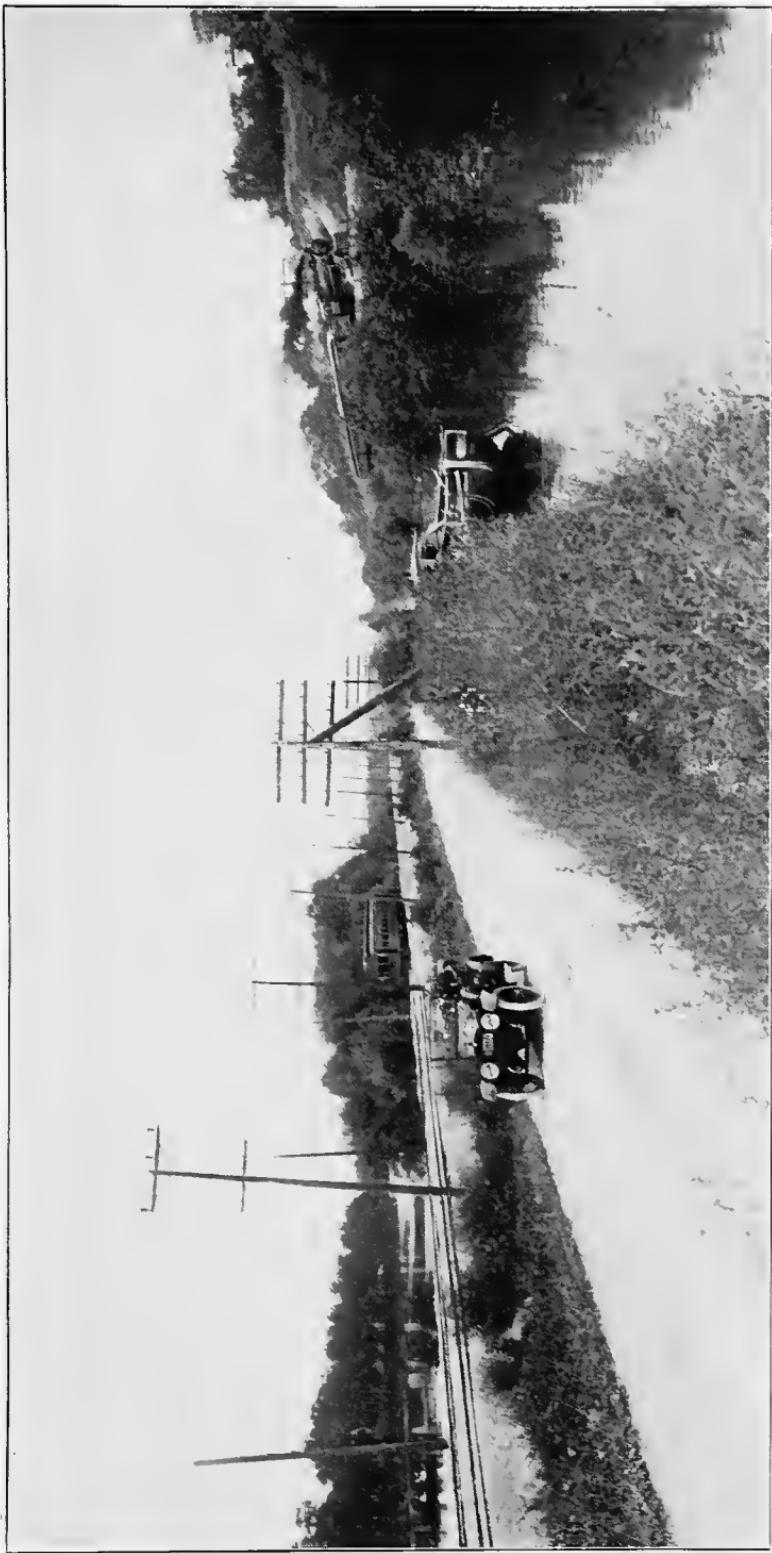


FIG. 3.—FIG. 3: METHODS OF TRANSPORTATION IN THE MIAMI VALLEY.

River, highway, canal, electric traction, and steam railroad are shown running parallel within a space of 200 feet. This view was taken near Miamsburg.

cality of both iron and coal; Boston, New York, and Philadelphia were made possible by natural harbors. In contrast with these, the Miami Valley lacks coal, iron, forests, large waterpowers, and harbors. Yet in no other section of the United States, excepting Massachusetts and Connecticut and the Mohawk Valley of New York, is there such an extensively varied manufacturing development. The valley produces three quarters of the world's supply of safes and vaults, though the iron for their manufacture and the coal used for fuel must be brought from outside. Against the same handicaps her soft iron castings and rust resisting ingot iron products are finding their way into all parts of the country. The various companies making automatic, cash, recording, and fare registers produce about three quarters of the world's supply, though all of the material must be shipped into the valley. The valley's paper mills produce 1,000 tons a day, nearly all being of the finer grades. This is a twenty-fifth part of the entire world's supply, though here, too, the raw materials must be shipped in.

What are the conditions which have produced here many hundreds of factories, nearly all representing the transformation of raw materials from other regions into a great variety of developed products? Cheap power has been a factor, for while there are no mines in the Miami Valley, the Ohio and West Virginia coal fields have supplied fuel at a cost during normal periods of less than \$2.00 per ton. The production of fine grades of paper would be impossible without the abundant underground supply of pure water, free from iron stain; and the location, midway between Chicago and the large eastern and northern cities not only makes available an abundant supply of rags for paper making, but also furnishes convenient markets for the finished products. The very fertile soil, by making the region largely self-sustaining in its food supply, tends to keep down the cost of living.

Yet none of these conditions, nor all of them together, explain the wide range and wonderful variety of the highly specialized manufacturers. Most or all could be duplicated elsewhere. The industrial development of the Miami Valley rests on the possession of still greater resources; for in the production of iron of exceptional purity, of delicate scales and recording machines, of complicated electrical devices, and other highly specialized products, the determining raw materials are not iron and brass, but human energy, persistence, and intelligence. To the stranger who makes his home in the Miami Valley there comes gradually a consciousness that here is not simply a replica of the usual American community. To the keen observer the population of the valley is distinctly characteristic; not through peculiarities of speech or manner, but rather in initiative; in the habit of undertaking, and of pursuing with a patient, intelligent persistence whatever object seems worth while. This characteristic gives a variety and wealth to the physical and to the higher resources of the valley which makes this region one of the great assets of America.

The earliest settlers were men and women who braved every hardship to found new communities in the wilderness. For nearly

half a century before the civil war the population of the valley was increased by southern men who were opposed to slavery, and who, for that reason moved from Virginia and Kentucky to Ohio. When the German struggle for a free government failed in the forties, many men and women, despairing of winning liberty at home, sought it in America, and the wonderful record of the Miami Valley in industry, thrift, and perseverance is to no small extent due to the German families that chose it for a new home, and to their friends who followed during the next generation.

The Miami Valley was settled by men of the pioneer spirit. When the opportunity for subduing the wilderness had passed, these people became pioneers in industry, invention, and in civic development. If it is true that the Anglo-Saxon is gifted with ability for keen insight into new fields of thought, while the Teuton makes a substantial, orderly, and honorable business out of life, then the intermingling of the best of these two races in the Miami Valley may explain in part this individuality.

If present tendencies continue, the valley will long stand out as one of those rare communities where coarse raw materials are mixed with brains to form the highly specialized products of our industrial life, and where new ground is broken in the field of thought. To fulfill this destiny it is of paramount importance that the valley be made secure from recurrences of disasters like that of the 1913 flood. The protection of the Miami Valley is worth while.

FLOODS IN THE MIAMI VALLEY

As Ohio cities began their existence when water transportation was essential to commerce, practically every large city in the state is located on a river or on the shore of Lake Erie; and as most of the rivers lack channels large enough to carry the water of great storms, it follows naturally that Ohio cities have a long record of flood experiences.

Some of the conditions which tend to produce floods are always present in the region of the Miami Valley. The rolling country with its short, steep slopes leading to innumerable little brooks and gullies, which in turn empty into the larger streams, tends to hurry the rainwater off the land and into the rivers. The soil, a mixture of clay, sand, and gravel, is sufficiently dense to prevent water from sinking into it rapidly during heavy rains. The digging of more than two thousand miles of ditches and drains for agricultural drainage and along highways and railroads, within the Miami watershed, has removed innumerable little storage reservoirs over the surface of the land, and by improving the overgrown and obstructed paths of the water, has tended to hurry it much more rapidly to the main streams; while the cutting of the forests, with the removal of the surface layer of leaves and mold, probably results in a similar tendency. The paving of city streets, and the construction of sewers would also hasten the flow of storm water, but the areas affected by city improvements are so small that their effect is negligible. The rivers of the region have formed for themselves



FIG. 4.—VIEW OF MIAMI RIVER BELOW DAYTON.
The river channel at this point has a capacity of about 25,000 second feet at bank full stage. The 1913 flood flow here was about 250,000 second feet.

natural channels of only sufficient size to carry the usual flow, and as the flow during great floods is many times as great as that of ordinary spring freshets, the river channels fail entirely to meet extreme conditions. Here and there along the rivers artificial obstructions have been created which to a greater or less extent interfere with stream flow, and the construction of cities in the valley hinders the free passage of overflow water. The levees built along the winding rivers to confine the flood waters, while they serve the purpose admirably until broken or overtopped, thereafter act as submerged dams.

The natural channel of the Miami River can carry only about 10 per cent of the flood flow of March, 1913 (See figure 4). Frequent inundations are therefore a certainty. The floods which have been experienced since the days of first settlement can be described best from occurrences at Dayton, since records there are longer and more definite than at any other point in the valley.

The Miami Valley was first settled at Dayton in 1796, and the first flood of record occurred in March, 1805. In the History of Dayton, published by the United Brethren Publishing House in 1889, Robert W. Steele gives the following account of the flood:

March, 1805, is noted as the date of the first great flood that occurred here after the settlement of the town. John W. Van Cleve gave the following interesting account of this flood in an address on the "Settlement and Progress of Dayton," delivered before the Dayton Lyceum, August 27, 1833, and published in the Journal:

"In the spring of 1805 Dayton was inundated by an extraordinary rise of the river. In all ordinary freshets, the water used to pass through the prairie at the east side of the town, where the basin now is, but the flood of 1805 covered a great portion of the town itself. There were only two spots of dry land within the whole place. The water came out of the river at the head of Jefferson Street, and ran down to the common at the east end of Old Market Street, in a stream which a horse could not cross without swimming, leaving an island between it and the mill. A canoe could be floated at the intersection of First Street with St. Clair, and the first dry land was west of that point. The western extremity of that island was near the crossing of Main and First Streets, from whence it bore down in a southern direction towards where the saw mill now stands, leaving a dry strip from a point on the south side of Main Cross Street, (now Third Street), between Jefferson Street and the prairie, to the river bank at the head of Main Street. Almost the whole of the land was under water, with the exception of those two islands, from the river to the hill which circles round south and east of town, from Mad River to the Miami. The water was probably eight feet deep in Main Street, at the court house, where the ground has since been raised several feet.

In consequence of the flood, a considerable portion of the inhabitants became strongly disposed to abandon the present site of the town, and the proposition was made and urged very strenuously that lots should be laid off upon the plain upon the second rise on the southeast of the town, through which the Waynesville road passes, and that the inhabitants should take lots there in exchange for those which they owned.

upon the present plat, and thus remove the town to a higher and more secure situation. The project, however, was defeated by the unyielding opposition of some of the citizens, and it was no doubt for the advantage and prosperity of the place that it was.

Sometime afterwards a levee was raised across the low ground at the grist mill, to prevent the passage of the water through the prairie in freshets; but not being built with sufficient strength and elevation, the floods rose over it and washed it away several times, until at length it was made high and strong enough to resist the greatest rises of water that have occurred since 1805, although one like the one of that year would still pass over it. The last time it was washed away was in August, 1814."

At an early day a levee was built by Silas Broadwell to protect the western part of the town from the overflow of the annual freshets. The levee began at Wilkinson Street, and ran west a considerable distance with the meanderings of the Miami. D. C. Cooper agreed to give Silas Broadwell certain lots in the vicinity of the levee in payment for building and keeping it in repair.

Mr. Van Cleve, whose account is here quoted, was the first white person born in Dayton, in June, 1807. His account, therefore, is not from personal memory, but as he was perhaps the best educated man in the city, and was much given to study and observation in geology, botany, and other scientific subjects, he probably gave an accurate record of this occurrence. At the time Dayton was settled, there was a gully running west at Third and Main Streets which, according to early accounts, must have been more than six feet deep. It is therefore difficult to judge the depth of the water by the reference to this point. The river bank at the head of Jefferson Street has also been raised 8 feet or more. The fact that an island existed at Main and Jefferson Streets indicates that the water was about 7.5 feet lower than in 1913. During the 1913 flood, a stage 7.5 feet below the crest represented a discharge of about 120,000 second feet, or approximately half of the maximum discharge. In 1810, or five years after the early flood, the area now covered by the city of Dayton was described as being a hazel thicket. Under such conditions the water did not have a free flow in its passage down the valley. Other references to this flood are largely repetitions of this same data.

In 1814 the Miami overflowed its banks at Dayton and destroyed the levee built just after the 1805 flood. Van Cleve gives the following data as to its depth, from which it would appear that the water did not rise as high as in 1805.

The water was deep enough to swim a horse where the warehouses stand, at the head of the basin, and a ferry was kept there for several days. The water also at that time passed through with a considerable current from the head of Jefferson to the east end of Market Street, and through the hollows in the western part of the town; and the plain through which the feeder passes, east of the mill race, was nearly all under water.

On January 8, 1828, the rivers were in flood, breaking or passing around all the small levees that had been built up to that time. Considerable damage was caused, small bridges were carried away, and a warehouse at the head of Wilkinson Street was destroyed.

In February, 1832, another flood occurred as high as that of 1828. This flood washed out the middle pier of the Bridge Street (Dayton View) bridge.

The following regarding the flood of January 2, 1847, is quoted from a short history of Dayton by M. E. Curwen, published in O'Dell's Dayton Directory and Business Advertiser, dated 1850.

I have now to do an act of justice to Dayton by stating the extent of the flood here, on the second of January, 1847. It has been so grossly exaggerated, that I have thought it worth while to give, in the accompanying diagram, an exact representation of that portion of the town plat, west of the Canal Basin, which was inundated. The submerged portions of it are marked in black. From this it will be seen, that not one-fifth of the whole town plat was overflowed; and from the levelness of the ground, every one, who has seen Dayton, will observe, that on much of that which was covered, the water could not have been more than a few inches in depth.

The river had been rising for several days; and on the 1st, the principal merchants, along the Canal Basin, thought it prudent to raise their goods to the second story, in anticipation of any accident that might happen to the levee, which was then new and not yet settled. A few minutes after midnight, the insignificant outer levee, that had for years been neglected and weakened by earth being hauled from it to fill up house yards and roads, gave way, near Bridge Street, and the inner levee, being insufficient to withstand the torrent suddenly rushing upon it, and rising in a breast two feet above it, soon after fell in. A breach once made, the waters rose rapidly, filling the cellars and covering the ground floors of houses in the vicinity. At one o'clock the church bells rang an alarm. A crowd of men with boats and on horseback, promptly turned out to rescue those who lived in the low grounds, west of Perry Street; while others assembled on the levee, north of Mill Street, with shovels, to check the leakage there. The water had by this time risen nearly to the top of the bank; and the work was soon abandoned as hopeless. A small party passed down Kenton, St. Clair, and Stone Streets, rousing the inhabitants along the line of the Basin, and advising them to move their valuables into the second story of their houses. The levee gave way near the head of Mill Street, about two o'clock, and the water, rushing down the canal basin, gradually rose to the level exhibited on the diagram, which is taken from a map, made by John W. Van Cleve, from personal observation, at the time.

In the course of the night, all the principal citizens opened their houses, lighted fires, and offered accommodations to those whom the water had temporarily rendered homeless. The Council, on the next day, voted a handsome appropriation to relieve the wants of the destitute.

It was a bright moonlight night, and the air was calm and mild. There was not a life lost, nor endangered, nor did any accident happen, during that night, nor afterwards. In striking contrast with the truth, it was represented abroad that one hundred and fifty persons, at least, were drowned; that the poor, shivering survivors were huddled together on the high grounds, wait-

ing their fate in agony; that people were rescued in boats from the third stories of some of the highest buildings in town; and that Dayton was literally in ruins! The damage was moderately estimated at a million and a half,—a sum, by the way, equal to half of all the personal property in Montgomery County.

From the most accurate information that could be collected, the loss sustained by private individuals in Dayton could not have exceeded \$5,000; and that was made up principally in the inconvenience occasioned by the wetting of carpets, the spoiling of such family stores as happened to be left in the cellars, the damage to fences from floating drift wood, and to yards by being washed by the torrent, etc. If engineers had quietly staked off the limits to which the waters rose, and slowly let them in upon the town to that height, for some public design, it is extremely doubtful whether it would have excited sufficient attention to interrupt, for half a day, the usual course of business. It is not that which we see, but that which we apprehend will come after—evils, bodied forth by the imagination, but which never happen—that chiefly excite our terror.

A levee was soon after constructed, which will completely secure the lower parts of town from any such catastrophe for the future.

It is very evident that this description is written in the spirit of apology rather than from the attitude of a disinterested observer, but it is the best record we have.

Heavy rainstorms starting on September 17, 1866, and lasting for three days, caused a serious flood. The levee gave way east of town and water rushed through the lower parts of the city, back-water from the Miami through an old ditch aiding in flooding the southern part. It was recorded that the water was one foot deep on the floor of the Beckel House (Third and Jefferson) and four inches deep on the floor of the Phillips House (Third and Main). All railway communication was cut off, and the losses to public and private property were estimated at \$250,000. After this flood, the river channel was widened by adding a span to the Third Street bridge and to the Bridge Street (Dayton View) bridge. No records have been found of the rainfall of this storm, but the month's rainfall for Urbana, the only station then in existence on the drainage area, was the highest recorded in a forty-three year record, and higher than any month's record on the drainage area since, being 15.88 inches as against 10.53 inches for the month of March, 1913.

Assuming that the record of the single station is representative, the lower stage of water with the higher rainfall in 1866 as compared with 1913, could be explained by the fact that in 1866 the swamp lands on the upper watershed were not drained, and constituted natural storage reservoirs, and also to the fact that the flood occurred at the end of summer, when the capacity of the soil to hold water naturally would be greatest, and when the runoff would be only half or two-thirds as much as would result from a like storm in March. As is shown conclusively in the Report dealing with rainfall, the precipitation of summer storms is very apt to include extremely heavy precipitation over small areas. It is very probable that the record for September, 1866, at Urbana held good for only a very limited territory.

There was a general flood in the Miami on February 3, 4, and 5, 1883, the danger being increased by the large amount of ice in the stream at Dayton. The water did not quite reach the high water mark of 1847, and was 2 feet below that of 1866. The maximum stage at Dayton was about 19.1 feet on the gage. Wolf Creek rose to an unprecedented height. The rivers did not overtop or burst their levees at any point in Dayton, but all of the low lying sections of town were flooded by water which entered through the flood gates of the canal, hydraulics, and sewers, which were frozen to their bearings and could not be shut. The water was 22 inches deep at the foot of Ludlow Street. After this flood, the levees were strengthened and extended. At Piqua and Tippecanoe the river was higher than at any previous time since 1866. One bridge was washed away above Troy.

The flood was caused by heavy rains lasting about thirty hours, beginning Friday night, February 2, and continuing all of Saturday and Saturday night, February 3. These rains were general throughout Ohio and Indiana, floods of great magnitude being reported at Cleveland, Indianapolis, Columbus, and at points in Pennsylvania. On February 15, nearly two weeks later, the Ohio River rose to a great height and Cincinnati and Louisville experienced floods. Farther to the west and north, the same storm that caused the flood on the Miami River took the form of a blizzard, which was notable for the depth of snow which it left in its wake. It succeeded a very cold spell during which considerable ice formed on the rivers. The breaking up of the ice gave very little trouble on the Ohio streams, though causing large ice jams in the Allegheny River and other Pennsylvania rivers. The only references to ice on the Miami River found in the daily papers tell of heavy cakes of ice which were mixed with the debris coming down the river, and which damaged bridge piers and levees.

It is important to note that according to newspaper accounts the flood crested at Dayton at 1:00 a. m., February 5, 1883, while Piqua reported the crest at 2:00 a. m. and Tippecanoe at 2:30 a. m. Springfield reported Mad River to be falling at 2:10 a. m., indicating that there also the crest was later than in Dayton. Wolf Creek began to recede about noon on February 4, its crest being 13 hours ahead of that on the Miami River. The data concerning this flood is taken from the Dayton newspapers of that date. Just a year later the water rose to within 1.5 feet of the same stage.

On May 12, 1886, a heavy rainfall, accompanied by a shower of hail, occurred generally over the drainage area, being especially heavy on Wolf Creek. The southern part of the city was troubled by the collection of storm water. The railway embankment across the Wolf Creek valley finally gave way, washing a number of houses on the west side from their foundations and flooding a large part of that section. On Fifth Street, from Wayne Avenue to Eagle Street, the water covered the streets and sidewalks for nearly the whole distance. Between Wayne and Bainbridge, and on Wayne from Fifth south to Burns, the water was about $2\frac{1}{2}$ or 3 feet deep,

and the territory bounded by Warren, Buckeye, Chestnut, Wayne, and Park Streets, was entirely submerged, deep enough in places to swim a horse.

On March 6, 1897, and again on March 23, 1898, there were severe floods. The Miami in both years broke into North Dayton at a sharp bend which has since been cut off, and flooded all the low ground in that section. The Riverdale section was flooded by back-water through the gates of the old hydraulic race which has since been removed. Storm water collected on the streets in the lower parts of the city, flooding a number of low spots to a depth of several feet. The level of the water in many places reached the top of the then existing levees which were raised about three feet during the next year.

More definite data as to the stages of early floods is given in Part I of the Official Plan of the District, published in 1916. Figure 5 shows the maximum gage heights reached at Dayton during past floods.

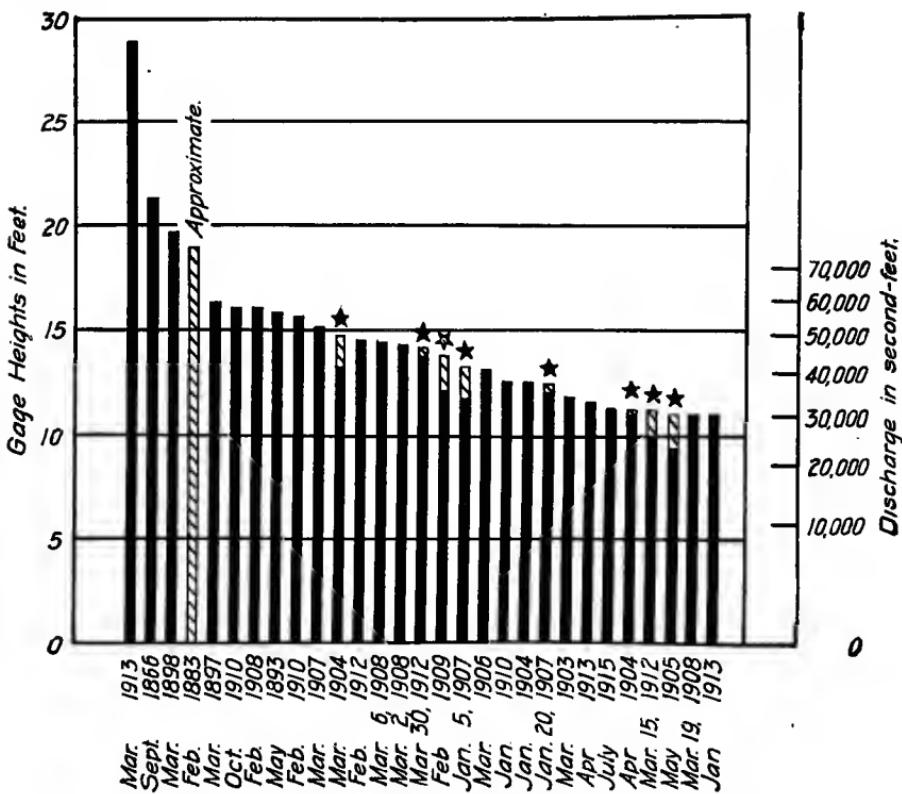


FIG. 5.—MAXIMUM MIAMI RIVER STAGES OF 11 FEET AND ABOVE, AT DAYTON.

Daily gage readings of the Weather Bureau for the period Dec. 22, 1892, to Jan. 1, 1916, and fragmentary early records were used in the construction of this diagram. Crest stages marked with stars were estimated from hydrographs.

THE FLOOD OF 1913

Permanent conditions of topography, soil, etc., heretofore described, were as definitely causes of the flood as were others more obvious and immediate, which existed during the last half of March, 1913. A similar rainfall on a flat, sandy region might not cause a great flood or do great damage. The controlling immediate cause was heavy rainfall, but the flood was greater because the rain came at the end of the winter season, when evaporation was slow and the ground too wet to take up readily a large amount of water. We realize the importance of evaporation when we know that in Ohio of the entire rainfall during an average year, only a third runs off into the rivers, while two thirds is evaporated into the air. If the storm rainfall of March, 1913, had occurred at the end of a dry summer, the resulting flood would not have been nearly so disastrous. On the other hand, other variable conditions might have existed to increase slightly the flow of water. If the ground had been thoroughly frozen, the runoff probably would have been somewhat greater, and if there had been a heavy accumulation of snow, this would have melted and added to the flood flow. As about nineteen-tenths of the rainfall ran off during the flood, frozen ground would have increased the flow but little. There were no failures of important dams or manipulation of reservoir gates which added in any material way to the volume of the flood flow.

The drainage areas of the Miami River at various points and of its principal tributaries are as follows:

Table 1.—Drainage Areas in the Miami Valley

MIAMI RIVER AND TRIBUTARIES

	Square Miles
Miami River above Lewistown Reservoir.....	100
Miami River at Sidney	555
Miami River at Piqua	842
Miami River at Troy	908
Miami River at Taylorsville Damsite	1,133
Miami River above Stillwater River.....	1,162
Miami River at Dayton, above Wolf Creek.....	2,525
Miami River at Dayton, including Wolf Creek.....	2,598
Miami River above Twin Creek.....	2,797
Miami River at South Line of Hamilton.....	3,672
Miami River at Mouth	5,433
Tawawa Creek at Mouth.....	56
Loramie Creek at State Dam.....	81
Loramie Creek at Lockington Damsite	255
Loramie Creek at Mouth	262
Honey Creek at Mouth.....	89
Wolf Creek at Mouth.....	73
Twin Creek at Damsite.....	270
Twin Creek at Mouth	313
Four Mile Creek at Mouth.....	322

STILLWATER RIVER AND TRIBUTARIES

	Square Miles
Stillwater River above Greenville at Covington.....	223
Stillwater River at Englewood Damsite.....	651
Stillwater River at Mouth.....	674
Greenville Creek at Mouth.....	219
Ludlow Creek at Mouth.....	66

MAD RIVER AND TRIBUTARIES

	Square Miles
Mad River above Buck Creek	324
Mad River at Huffman Damsite.....	671
Mad River at Mouth ..	689
Buck Creek at Mouth.....	164

Weather Immediately Preceding the Flood

Prior to Monday, March 24, no conditions existed in the Miami Valley which were interpreted as reasons for expecting a great flood. However, the month was most unusual in perturbed weather conditions. Such atmospheric disturbances are not superficial phenomena, but represent transfers of energy in amounts inconceivably great. For instance, simply by the condensing of the 9.7 inches of rain which fell during 5 days on the comparatively small area of 3670 square miles of the Miami River watershed above Hamilton, enough energy was released to supply 2,500,000 horsepower 24 hours a day continuously for a hundred years. The underlying causes of these great manifestations of energy are not understood.

On the 13th a storm center formed over the Rocky Mountains, developing unusual proportions as it moved eastward. At the same time the southern states from the Mississippi River to the Atlantic Coast were visited by many tornados which killed numerous people and did great damage, while unusual rainfall caused floods in many rivers. In South Carolina, Georgia, and Alabama the rainfall for the month exceeded that of any March on record. On the 19th and 20th a second storm, forming over the Rocky Mountains, moved across the country, passing north of the Great Lakes. At the same time another disturbance, originating in the southwest, moved rapidly to the north, becoming a storm of great violence over the Great Lakes, attaining velocities of 80 to 100 miles an hour, and doing great damage. Europe was at the same time experiencing similar disturbances, and on the 18th 80 ships, most of which were small, were sunk in a storm near Hamburg, Germany. On the 21st there were again destructive tornados in the southern states east of the Mississippi River.

The atmospheric disturbance which was the forerunner of the Ohio storm became evident in California on the 20th. On the 22d its center was over Nevada, and during the next day it moved rapidly eastward, until by the morning of the 24th its center was over Michigan. Throughout the entire territory from the Rocky Mountains to the Atlantic coast local storm conditions became evident

on the 23d. Through western Kansas windmills and wire fences became so charged with electricity that sparks would jump gaps of unusual width, while persons touching each other would experience distinct shocks. On the evening of the 23d Omaha was visited by the most serious tornado in its history, 94 people being killed, while the value of the property destroyed was \$3,500,000. A few hours later at Davenport, Iowa, a similar tornado occurred, fortunately without crossing a thickly settled part of the city. During the same evening a tornado passed over Terre Haute, Indiana, killing 21 persons, and injuring 250. Probably many similar disturbances in various parts of the country were not reported, because not being in centers of population, there was little loss of life or property.

Rainfall Causing the Flood

A general rainfall occurred over the Miami Valley watershed on the 23d, but the total amount—half an inch at Springfield, Dayton, and points south, increasing to one inch at Piqua and to two inches at the northern limits of the watershed—was not enough to cause alarm. The following account of the further progress of the storm is from a description by Professor Alfred J. Henry in the U. S. Monthly Weather Review for March, 1913.

* * * * Sunday night, March 23, rain continued uninterruptedly over the above territory, but the intensity was not so great. During the daylight hours of Monday, March 24, rain ceased in northern Illinois, but the intensity over southern Indiana and southern Ohio was greater than on the previous date, and it is to be noted that whereas the rainfall of the previous 24 hours had been most intense on the headwaters of the Wabash River of Indiana and of the rivers of Ohio which flow southward, the area of greatest intensity on the 24th was over the lower reaches of the same streams, including both forks of the White River of Indiana.

Monday night, March 24-25, brought a continuation of the rain over Illinois, Indiana, and Ohio, and it also extended along the lower Lakes down the St. Lawrence Valley, and into northern New England. The region of great intensity, as in the previous 24 hours, being in central Indiana and over practically the whole of central and northern Ohio. During the daylight hours of Tuesday, March 25, the rainfall in Illinois was light, but it continued with little abatement over southern Indiana and central Ohio, and it was to the rainfall of this period, daylight hours of Tuesday, March 25, over Ohio and Indiana, that the rivers of those States received the increment of water which sent them forth on their impetuous career of destruction. Up to this time practically all of the precipitation had been north of the Ohio River; meantime the Low, to which the precipitation was due, had passed rapidly northeastward beyond the field of observations.

Development of Secondary Low—It sometimes happens when a Low centered over the middle or northern portions of the United States moves rapidly northeastward, as did that of March 23, 1913, it leaves behind it a trail, so to speak, of low pressure and unsettled weather, or in the more technical language of the weather map, a trough of low pressure is formed, i. e., a region of low pressure whose bounding isobars have the form of a

trough or very elongated ellipse; frequently too, the center of activity in such pressure formations may be at either or both ends of the trough. In case the northern center of activity moves rapidly to the northeast, the southern center, if only moderately well developed, generally increases in intensity and moves northeastward much as an independent Low and thus a region deluged by the upper end of the trough receives a second downpour almost immediately, due to the southern extension of one and the same storm, and this is what happened over the Ohio Valley between the dates of March 23 and March 27. On March 25 a trough of low pressure had developed which extended from New England on the northeast to Texas on the southwest, and in which there were two centers of activity, the northernmost extended from western Pennsylvania southwestward to southern Indiana; and the second center occupied northwestern Arkansas. Both of these centers delivered their quota of rain over the Ohio Valley and by the morning of March 26 had merged in a single center which overlaid western New York; meanwhile the third of the series of secondary disturbances resulting from the trough of low pressure which formed on March 25, appeared over extreme southern Texas. This last disturbance moved northeastward across the Appalachians in eastern Tennessee and Kentucky.

The development of the trough form of disturbance on March 25 resulted in two things, viz., (1) a continuation of heavy rains in the basins of the northern tributaries of the Ohio and (2) the extension of the rain area to the tributaries which enter the river along its south bank. If there had been any doubt hitherto as to the occurrence of a disastrous flood in the Ohio River proper it was removed as soon as rain began to fall in great amounts over the southern watersheds.

The rainfall which caused the flood in the Miami Valley began on the 23d, and lasted until the 26th. The small amount of rain on the 27th had little effect on the flood stages, as the flood was largely past by that time. The six maps, figures 6 to 11 inclusive, give a clear idea of the distribution of the rainfall. The heavy black lines are lines of equal precipitation. For instance, on the map for March 23 the line marked 1" indicates that on one side of this line more than 1 inch, and on the other side less than 1 inch fell. In the territory between the line marked 1" and the line marked 2" the rainfall on the 23d was between 1 and 2 inches. The number following the name of town is the depth in inches which fell at that place. Five maps show the rainfall on the separate days, while the sixth, figure 11, gives the total amount which fell during the entire five days. A more technical and complete discussion of the rainfall and runoff of the flood will be given in a subsequent report.

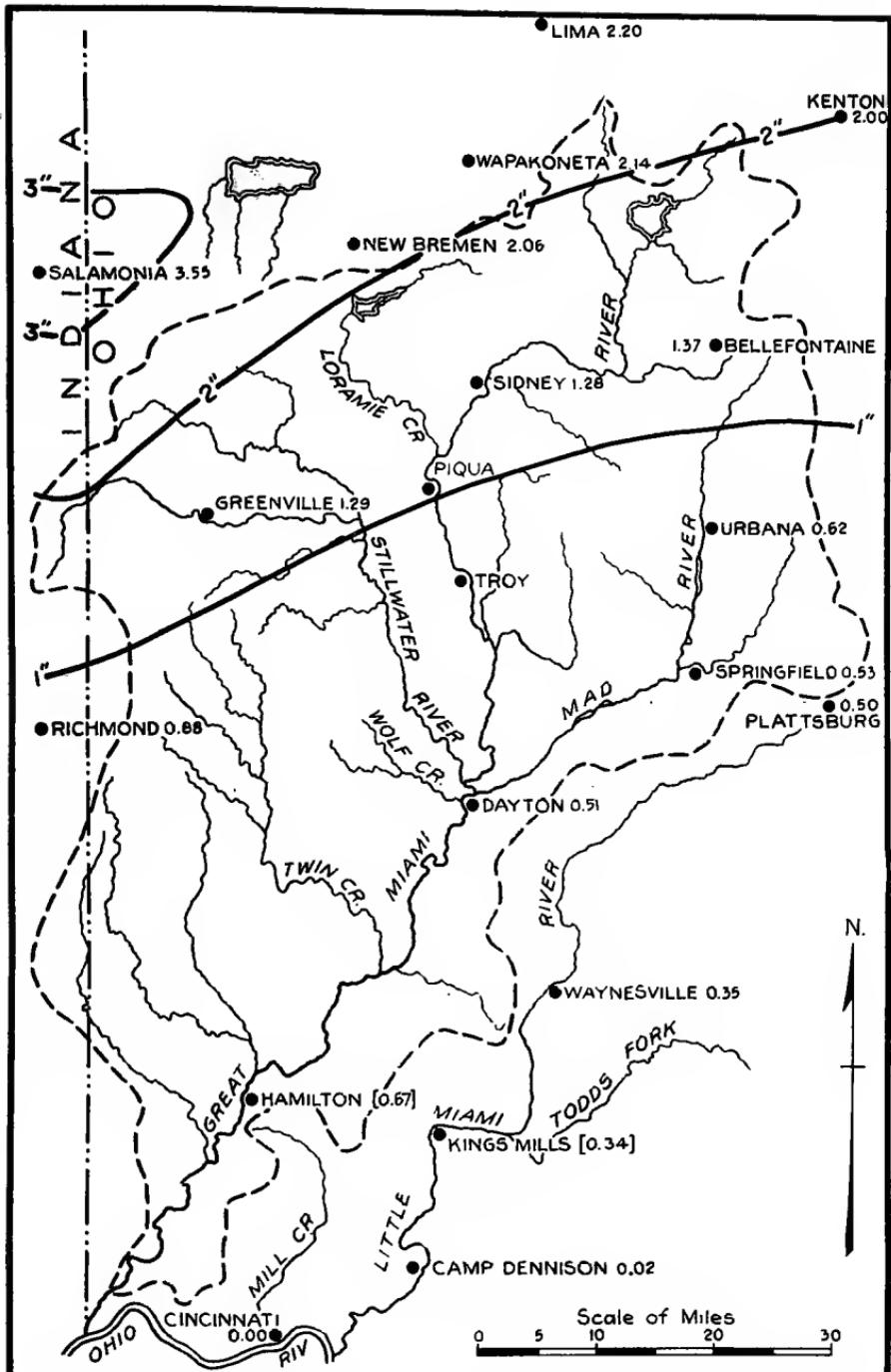


FIG. 6.—RAINFALL MAP OF MIAMI DRAINAGE AREA FOR MARCH 23, 1913.

The depths of rainfall measured at the observing stations are shown in inches.

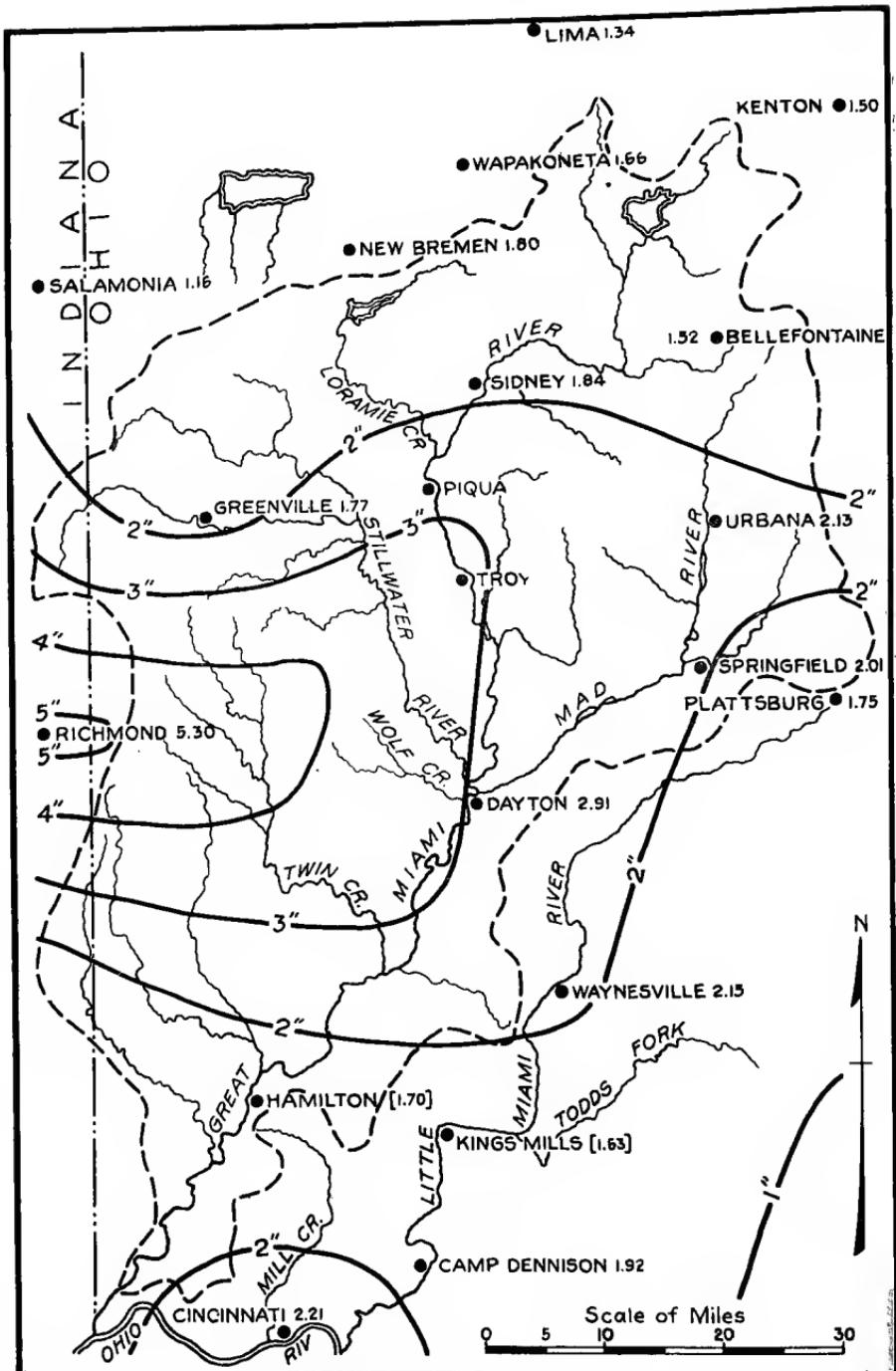


FIG. 7.—RAINFALL MAP OF MIAMI DRAINAGE AREA FOR MARCH 24, 1913.

The depths of rainfall measured at the observing stations are shown in inches.

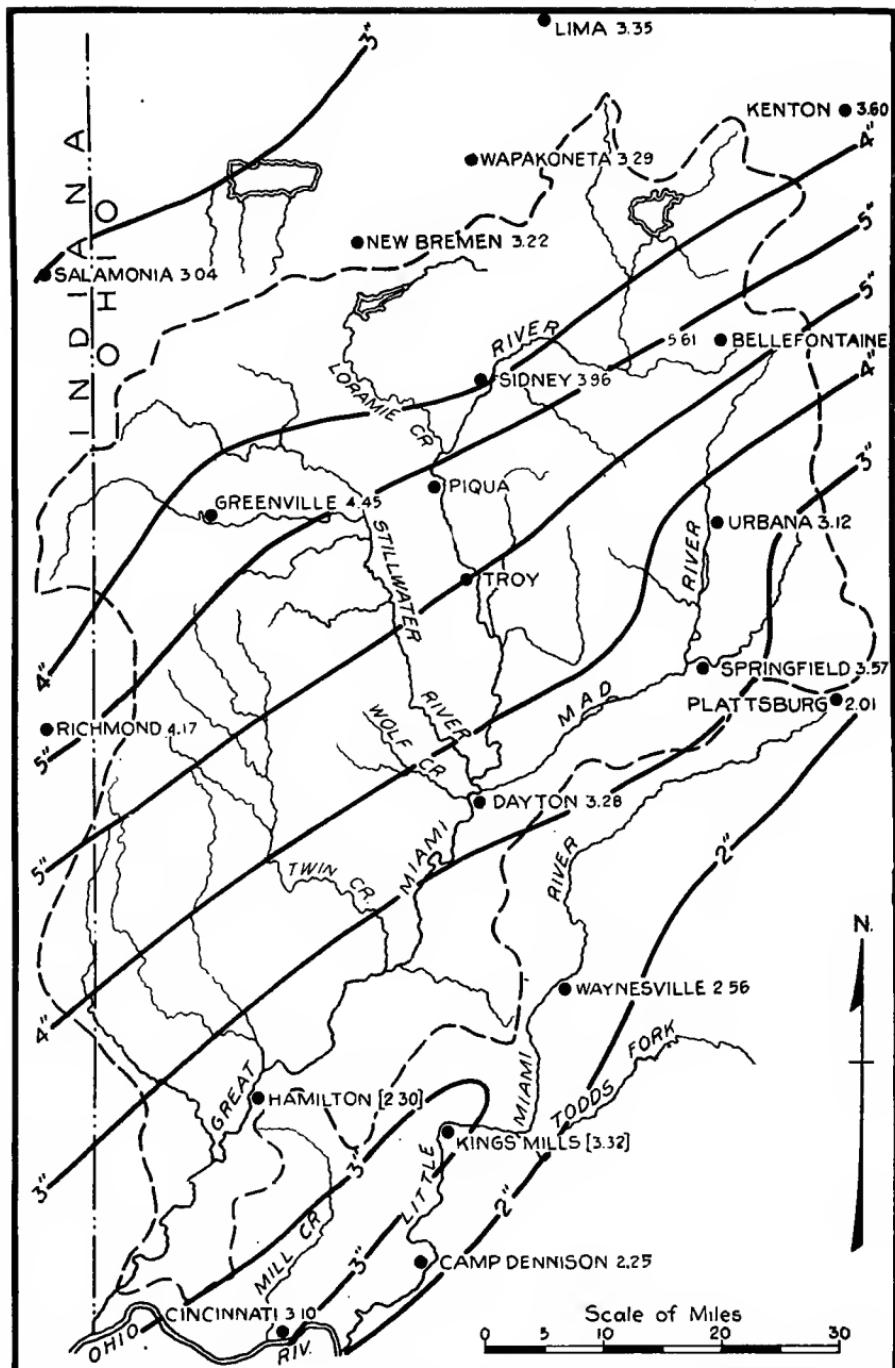


FIG. 8.—RAINFALL MAP OF MIAMI DRAINAGE AREA FOR MARCH 25, 1913.

The depths of rainfall measured at the observing stations are shown in inches.

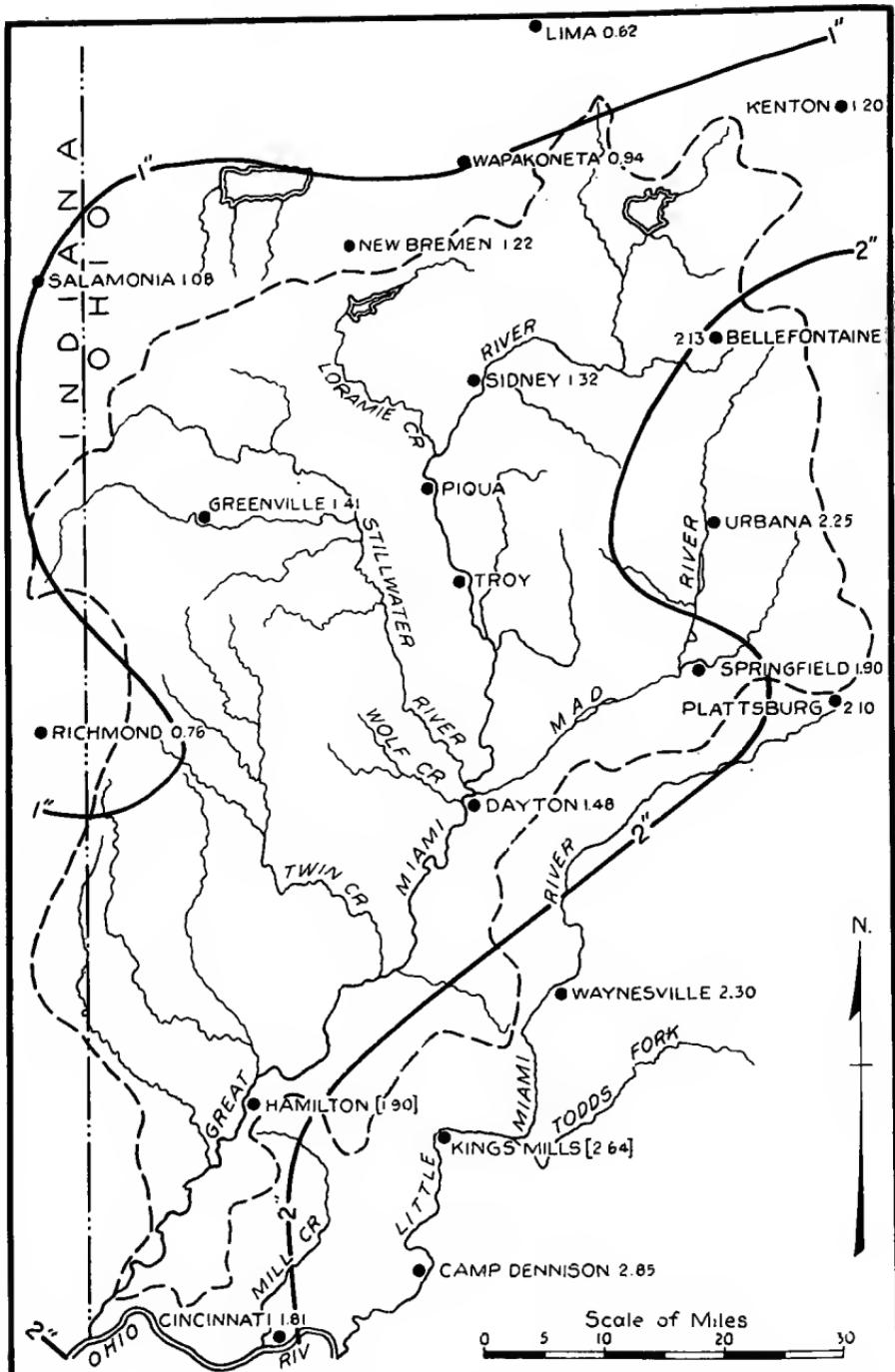


FIG. 9.—RAINFALL MAP OF MIAMI DRAINAGE AREA FOR MARCH 26, 1913.

The depths of rainfall measured at the observing stations are shown in inches.

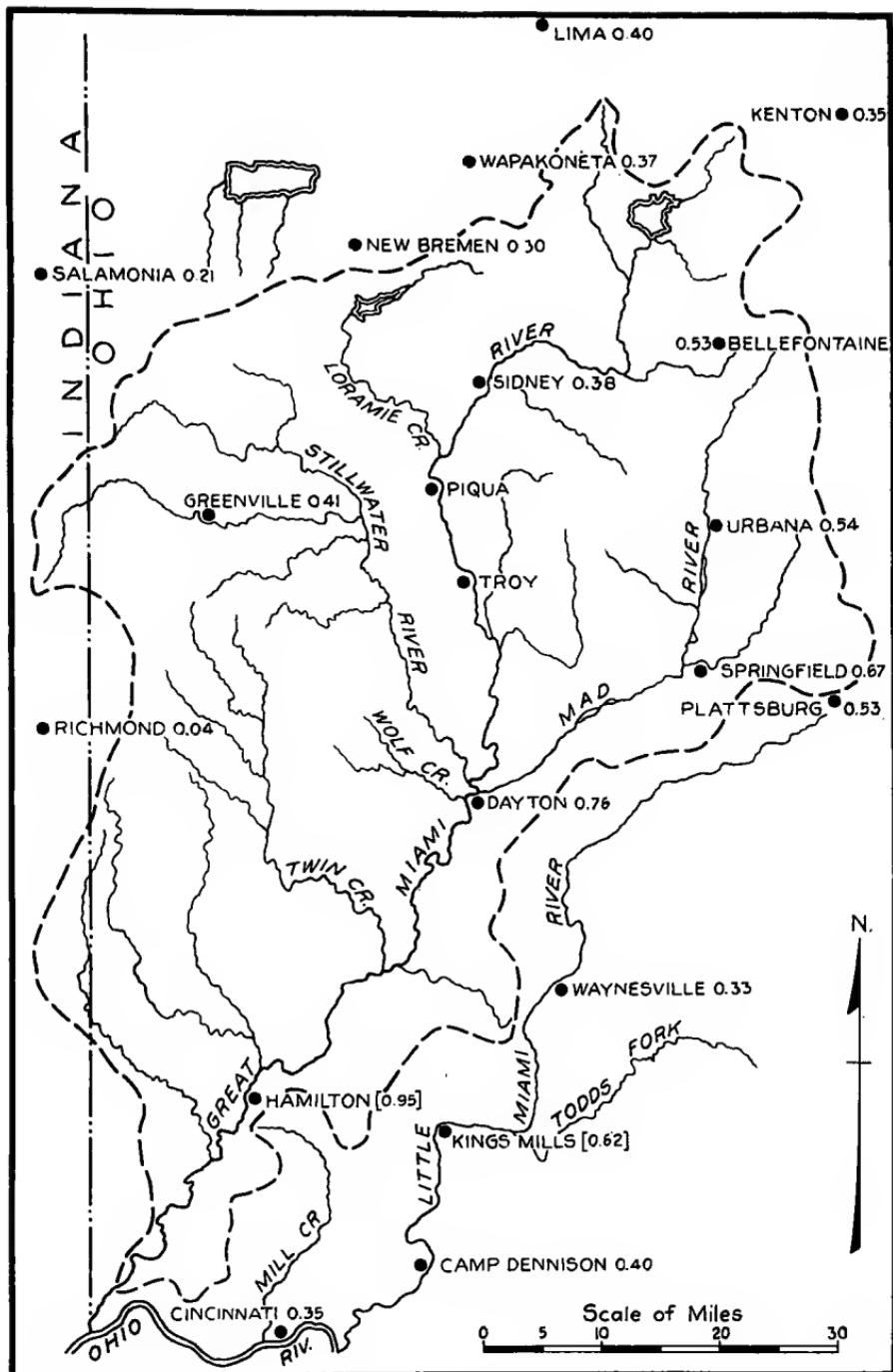


FIG. 10.—RAINFALL MAP OF MIAMI DRAINAGE AREA FOR MARCH 27, 1913.

The depths of rainfall measured at the observing stations are shown in inches.

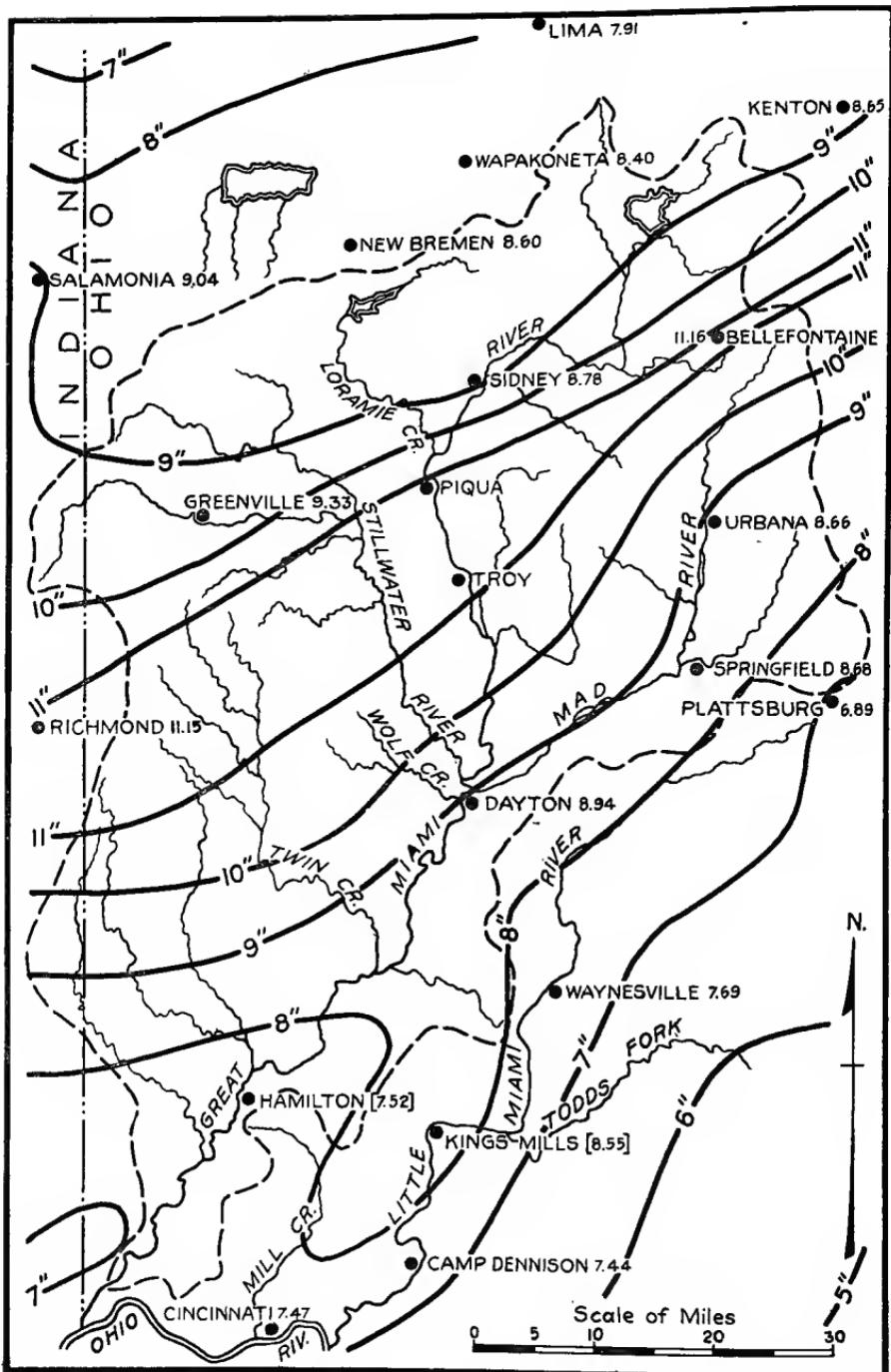


FIG. 11.—CUMULATED RAINFALL MAP OF MIAMI DRAINAGE AREA FOR MARCH 23-27, 1913.

The depths of rainfall measured on the successive days of the storm, and shown in the five preceding figures, have here been totaled. Each observing station shows the rainfall in inches for the entire storm period.

The Day Before the Flood

The rainfall of Sunday, the 23d, had been very general, but not unusually heavy.

On Monday, the 24th, a heavy rain fell over the entire watershed of the Miami, and over nearly all of Ohio and Indiana. At Dayton, Troy, and Piqua the precipitation was about 3 inches, increasing to 5 inches at Richinond, Ind., and decreasing to 2 inches on the north, south, and east. Even a smaller rain would have overtaxed the river channels, and toward evening the upper Miami had reached the danger mark. When the news spread through Piqua, many people went to watch the high water from the bridges on the Miami. At Troy the river reached flood stage about ten o'clock at night, but at Dayton the water had reached only the stage of frequent spring freshets, and no great alarm was felt. The Dayton Daily News of Monday evening, March 24, had the following item:

The river has been rising steadily since the heavy rains of Sunday and the following stages since six o'clock Monday morning tell the story:

6:00 a.m.—	7	feet	2	inches
8:00 a.m.—	7	"	9	"
9:00 a.m.—	9	"	5	"
11:30 a.m.—	11	"	2	"
12:30 a.m.—	11	"	7	"
2:30 p.m.—	12	"	8	"

The report is that even though the rain does not continue over the night, the river will in all probability rise until Tuesday morning, when it is expected to have reached its crest, provided of course that the rains do not continue north of the city.

The weather bureau predicts rain for Monday night, both east, west, and north of the city, which means a river that will border on the unusually high stage that was recorded about this time last spring, when the highest point for a number of years was recorded. Even at that point no serious damage resulted, and there is no cause for uneasiness on the point of floods from the Miami at this time at least.

The city engineer sent out a corps of men Monday to turn off all sewers that open into the river and the pumping relief station is ready to respond to the call should the emergency arise. It is said that the river's stage will be watched during the night on account of danger that some low places in the city are always subjected to from backwater.

The Columbus Weather Bureau Office had sent out flood warning telegrams to the cities along the river, and the usual precautions were taken at Dayton and Hamilton to close the flood gates of the sewers. At Dayton the local weather bureau official called up by telephone people living in the lower parts of the city where high water frequently causes inconvenience.

The Flood at Piqua

In the upper river the rise was very rapid during the night. By eleven o'clock the water at Piqua had reached the highest stage ever recorded. When appeals for boats began to come in, the city officials sent five to the southeast part of the city, known as Shawnee, and others to Rossville, just across the river to the north. Boatmen were kept busy carrying people to places of safety, until the current became too swift for managing the boats. The telephone operators warned every household in the low lying parts of town that had telephone service. All night long the water rose. The electric light plant was flooded and out of use, and the rescuers at the water's edge working in the rain and darkness, could only surmise by the crash of collapsing buildings and the frantic cries for help, what was going on in the terrible current that was tearing a path through the east part of the city.

At dawn, through rain that was still falling, the valley was revealed as a lake of surging, muddy water. The flood had reached the floor of the Rossville bridge, at the north edge of town. The old Pennsylvania Railroad bridge still stood, but the entire east approach had been washed away, and the contractor's plant for the new bridge piers just to the north was destroyed. The Shawnee bridge just south of the railroad bridge and the Bridge Street bridge further south were wrecked.

In Shawnee the roofs of some of the cottages and upper portions of the second stories of larger dwellings appeared above the flood. An expanse of gray water covered the places where other houses were known to have stood. In the early twilight people could be seen in little clusters on the roofs of some of those which remained. The water still rose and now its progress could be watched as it crept up the houses board by board. Cottages began to stir uneasily on their foundations, then one by one to swing out into the channel, riding swiftly until they battered into the wreckage at the bridge and were crushed.

Their occupants, when there were any, scrambled for the roofs of other houses which they touched in passing, one or two swung up into trees, some were unable to save themselves. Forty-four people were drowned in Shawnee and Rossville. Many houses were washed away and destroyed. The wonder is that five times as many people were not lost. Some families escaped destruction by the merest coincidence of time and circumstance.

Early Tuesday morning a rescue party on the Bridge Street bridge saw a little child's head peeping through the roof of a house floating down the river. When the house struck the piers it collapsed, but the wreckage hung together for a moment. Without hesitation the men on the bridge climbed down to the battered house and rescued a stunned and bleeding man and five children. The mother of the family was dead from exposure and fright, and it was impossible to secure her body before the remains of the house were drawn under the bridge and spat up as kindling wood for a hundred yards below.



FIG. 12.—EAST PIQUA (SHAWNEE) DURING THE FLOOD.

One of the localities where many cottages were swept away by the swirling muddy waters.



FIG. 13.—COTTAGES WERE MOVED OFF THEIR FOUNDATIONS.

People trapped in the upper stories of their homes chopped holes in the attic walls and roofs in order to escape.

One expert boatman, a man of nearly sixty, saved many people by his daring. Following a house that was being carried down the river he rammed the bow of his boat against a corner of the roof and its occupant, a man, jumped to safety. A little later this boatman rescued another man from a tree, and then went on down to the bridge, which had turned over on its side, and got off three more men.

The swift current made it impossible to reach many imprisoned people. When the flood reached the second story of his home, one man took a bed slat and forced a hole through the roof. He then lifted his wife and four children through the hole. Wrapped in bed clothes this family stayed on the roof in the cold rain for 32 hours. Buildings near them were demolished and the rear of their own house was torn away. The group on another roof consisted of thirteen women, and children, a sick man, and one able-bodied man. The latter's wife and another woman became so hysterical that it was necessary for him to tie them both with bed clothes to the house top in order to prevent them from jumping into the seething water. Eighteen persons who took refuge in one cottage were compelled to tear off the plaster ceiling and stand or sit on the joists. As an emergency measure someone punched a hole in the roof. For thirty hours they were held in the cold and darkness while the water lapped against the walls a foot or two below.

The flood came to most people in Piqua as a most surprising and dramatic occurrence. Early in the morning hundreds gathered at the water's edge to watch the rising tide. The wildest speculations were rife as to its cause and the probable loss of life. As they watched, the muddy waters seemed to boil up out of the bed of the river and to grow visibly in volume. The rain continued, and no one could predict when the waters would begin to subside. People living blocks from the flood zone turned toward home with the thought of packing their belongings. Until ten o'clock that morning the water rose. It held stationary for four hours, and at two began gradually to subside.

The Flood at Troy

At Troy the progress of events was somewhat similar as to time. By ten o'clock Monday evening the river had reached the danger mark and was beginning to flood the lowlands on the left bank north of the city. Watchmen with lanterns were stationed at critical points. Continuing to rise rapidly, the river reached the highest known stage by two o'clock at night, and a general alarm was sounded. Whistles were blown, fire-bells were rung, and two men on horseback rode through the streets crying a warning.

Before daybreak the water flowed through west Troy flooding houses to a depth of ten feet or more by the time it had reached its crest. Here the greatest damage was done. The central part of the city was left as an island, and as the waters rose, covering the higher streets, this island was divided into two by overflow along the general route of the canal.

MIAMI CONSERVANCY DISTRICT



FIG. 14.—THE COURT HOUSE AT TROY DURING THE FLOOD.

Built on some of the highest ground in the city it stood, together with neighboring residences, on an island.

Many citizens awoke to find their yards submerged. First in amazement, then curiously they watched the water rise until they realized the import of the situation. After household goods had been carried upstairs or piled on tables, a few waded out to high ground. Early in the day men living near the north end of town had secured boats, and relief and rescue work were promptly started. The racing current through west Troy, the whirlpools, and drift made this difficult and dangerous, and where the water was not over a foot or two deep on their first floors most people preferred to remain in their own quarters. At ten o'clock Tuesday morning something like one-half of the principal residence portion of Troy, and practically all of the industrial section were submerged three to ten feet. Many houses and small buildings had been destroyed, nine or ten bridges in the county had been washed out, and the water was still rising, though more slowly.

In the lowlands north of the city, in the little cluster of cottages known as Nineveh, inhabited by a number of colored families, the flood came so swiftly that few residents had time to escape. Shut in a little cabin were several women and children and a man, who had been forced to climb into the rafters. In some manner the man succeeded in prying open the door below him and in fixing a bed slat across it. The water was within a foot and a half of the lintel, but the black man never lost hope. Every ten or fifteen minutes, for hours, his head came craning out while he called lustily for help and waved his hand to the crowd. Although they were hardly two hundred feet away it was impossible to render any assistance.

When their homes were swept away or filled with water two colored women and a man climbed into a tree. There they were discovered in the morning not much over a hundred feet from high ground. Crouching in the cold drenching rain, practically unable to move, their positions were becoming intolerable. Crying to onlookers to save them and praying continually for help they hung on desperately. A white man made the first attempt. His boat was carried across the upper railroad bridge, and from there he started down stream. Keeping in the comparatively slow moving water below the abutment he approached the tree, but at the moment when it seemed that he would be successful in taking them off, his craft was swept out into the current and went dashing down the main channel. There appeared to be no hope for this man as his boat swept toward the lower bridge, but at the moment when it crashed into the structure, a quick-witted watcher on the bridge threw off his overcoat, and leaning low over the girder dropped the skirts of the coat to the boatman and drew him up to safety. All through the morning the three colored people clung to the tree. Now and again a heavy piece of drift came pounding against it, and it seemed only a question of time until the huddled figures would drop.

Through west Troy the most western of the three streams was now running like a rapid. Living in a cottage near the center of this channel was a family of three, husband, wife, and child. Three friends went to their assistance in a small dory. Leaving the little

house the six were caught by the rushing current. As they passed close to a tree someone succeeded in passing a rope around the trunk and making it fast. They tossed there for five or six hours, then the tree quietly toppled down and sank the boat. Wife, child, and husband were drowned; one man succeeded in catching a tree near at hand, another was carried a quarter of a mile to a clump of trees into one of which he climbed, the third kept afloat and was pitched into still water a mile below where he swam to shore.

The main business portion of Troy lay in the upper island and was practically untouched by the flood. By noon a relief organization was formed and distressed persons were being cared for. The water continued to rise until two o'clock, when it held stationary for a short time, and then began gradually to subside.

Crowds stood in the rain on the bank of the river where the colored people still cried for help. Late in the afternoon two men, an interurban motorman and an unknown vagrant, volunteered to make another attempt to rescue those in the tree. A windlass was fastened to the bridge and the boat slowly dropped down the current. Numb and stiff the women and man started for the boat eagerly and awkwardly. The last aboard made a mis-step and all were thrown into the river. The negroes and the vagrant were drowned; one man, the traction employee, after a long, hard battle reached another tree.

Throughout the night the water continued to fall, and Wednesday morning found the two islands re-united. The stream to the west of the city had abated and early in the day it was possible to rescue the two men who had escaped when the occupants of the cottage were lost. After a night in his tree the motorman was also taken off, but the persistent colored man in the little cabin could not be reached.

The rise of the water at Piqua and Troy was very rapid during the late afternoon and evening until one or two hours before midnight. By this time it had reached to within one or two feet of the crest, and the rise for the next 12 or 14 hours was very gradual, only one or two inches an hour. The crest was reached at about eleven o'clock Tuesday forenoon, March 25, at Piqua, and about two hours later at Troy. The time of the crest at Troy is variously reported at from noon to 2 p. m.

The Flood at Dayton

During Monday night while the people of Piqua and Troy were overwhelmed by the flood, the people of Dayton and Hamilton were comfortably asleep. If word of the coming waters had been carried down the valley, the loss of life and property at and below Dayton would have been less. At midnight the river at Dayton stood at 14 or 15 feet on the gage, representing a flow about two-thirds as great as the channel would carry, and less than a fifth as much as was flowing through the city twelve hours later.

Mr. Cummin, the City Engineer, crossing the Dayton View bridge about 5:30 or 5:45 a. m. Tuesday, the 25th, found the water



FIG. 15.—SECOND STREET, DAYTON, AFTER THE WATERS BEGAN TO SUBSIDE.
This view shows the Rike-Kumler store at Second and Main Streets. With all of its
plate glass windows destroyed, this store, in common with others, suffered complete loss of
all goods on its main and basement floors.

to be near the tops of the levees. At that time the river channel was carrying about 100,000 cubic feet per second, or about two-fifths of the flow during the highest water. He went to Riverdale, where at about six o'clock the water was appearing in the streets, coming from a break in the levee below Island Park and over the top of the levee at other points. In the vicinity of Floral Avenue there was but a few feet of water. Rescue work with boats from the boat clubs commenced in Riverdale as early as half past six. The boat house had not been flooded at that hour, and motor trucks and wagons were used to secure boats and canoes. The rescue work continued without organization until the water reached the hips of the rescuers. The unconcern of the people of Riverdale was remarkable. Most of them stood watching the water come, making little or no effort to get out. Nearly all those who were imprisoned in Riverdale had ample time to escape after the water began to rise.

The overflow of the levees on the south side of the river did not begin until 7:30 or 8'oclock, the first water coming over the north end of Jefferson Street. At the other end of the city people living on higher ground were becoming aware of the flood.

On Tuesday morning H. E. Talbot started for town in his car. He tried to come in by South Main Street but encountered water, so he went around to the east on high ground. Coming in by East Fifth Street he ran to Main and thence to Monument. He saw conditions but did not fully appreciate their seriousness, and returned to the country for his family. When they entered East Fifth Street on his return, they ran west and presently found that Fifth Street was under water in the down town districts. Horses and debris were floating past. He turned the car around and started for a planing mill to order boats. As they ran east the water began rising about the car, and as they neared high ground a wall of water three or four feet high poured down upon them. This water carried wooden sidewalks, fences and all sorts of debris before it. His carburetor was put out of order by the rising water when they were 50 feet from high ground. A number of men running past caught hold of the car and pushed it to higher ground.

He went to the National Cash Register Company offices and discussed the situation with Mr. Patterson. The building of boats was commenced at once under Mr. Talbot's direction. The first made was of 1-inch planks. They hurried this to the water and after a trial the design was modified and 2-inch planks were used. A hundred and sixty-seven were made the first day, each fitted with 4 oars. These boats were very cranky and were safe for use only in comparatively still water. But there is no doubt that many people owe their lives to them.

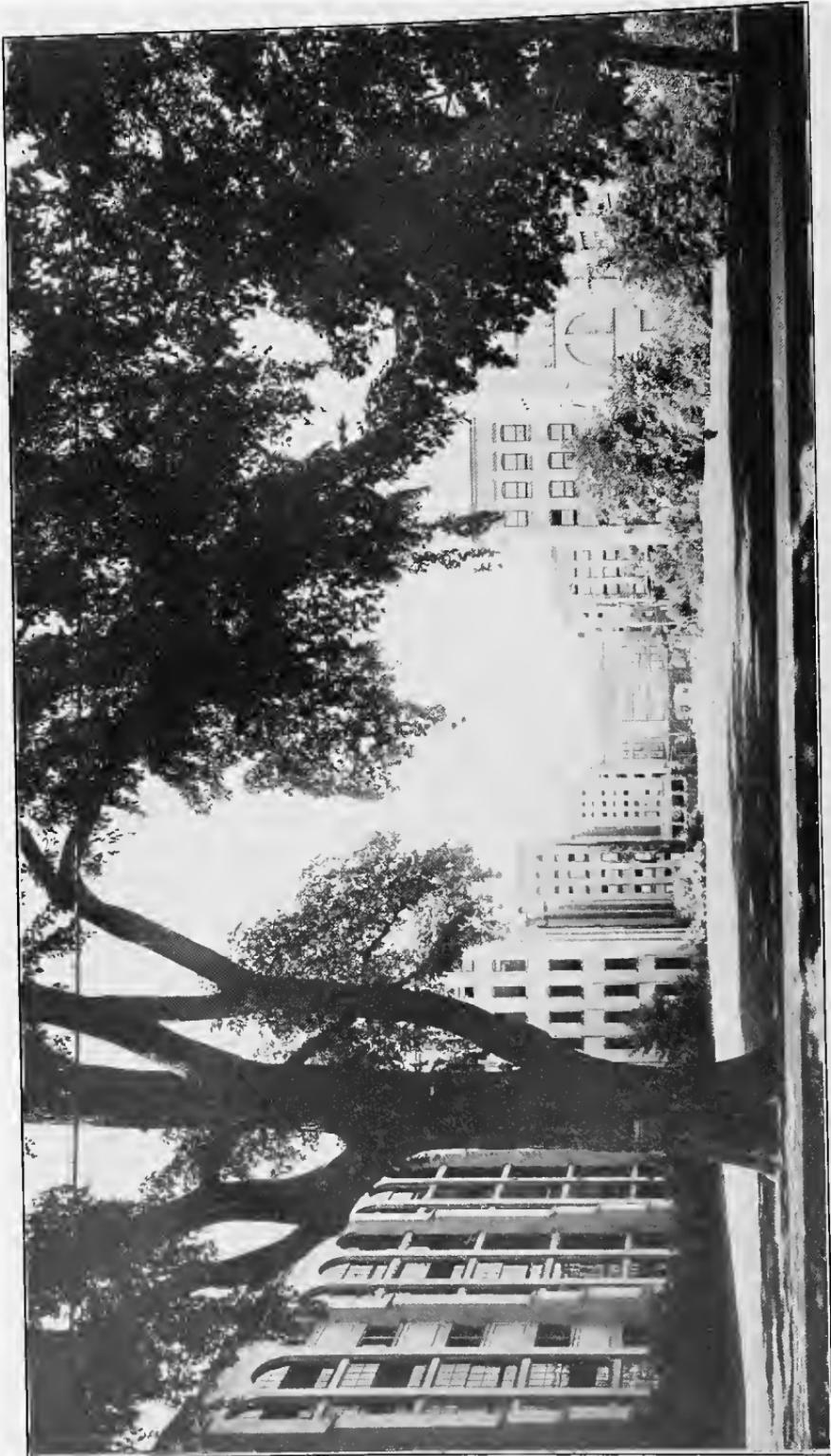
During the first day every one gave his efforts promiscuously to the relief work, which was not organized. The National Cash Register Company had facilities, materials, and organization and as a natural result relief work soon centered there and was definitely organized that evening. The floors of the shops were cleaned out, kitchens started, and all rescued people brought there for safety and

FIG. 16.—DISTINCT HIGH WATER MARKS WERE LEFT BY THE RECEDING WATERS.

On many buildings the marks left by the flood are still plainly visible. Boats made at the National Cash Register factory being used in rescue work. The snow on the roofs indicates temperatures which prevailed while men and women sat in their wet clothes on roofs or in trees waiting to be rescued.



FIG. 17.—A GLIMPSE OF THE NATIONAL CASH REGISTER FACTORY BUILDINGS, DAYTON.
This institution, which was not injured by the water, became a veritable haven of refuge during as well as after the flood. Much of the rescue work, care and feeding of the destitute, and other forms of relief work were initiated here.



shelter. Straw was placed on the floor and thousands slept in the buildings for some weeks. Emergency hospitals were established as well as bureaus of information, etc.

Securing provisions and supplies was a difficult problem but was greatly facilitated by the promptness with which everyone responded. Among the most urgent needs were gasoline and rubber boots. The Standard Oil Company sent gasoline by motor trucks and in railroad tank cars at the earliest moment and boots were obtained in car load lots from Cincinnati. The farmers for 20 miles back from the river rendered the greatest assistance. They slaughtered pigs and steers, and brought in wagon loads of potatoes. Their wives baked bread and made pies and cookies. At first some sent sandwiches, but on account of their perishable nature they were not always useable. It was the staples which were sought. Flour, salt, sugar, coffee, and meat came in from Cincinnati where cars destined for other cities were diverted and sent up the valley. Receipts were given for provisions, and payment promised in the name of the state or city. In many cases farmers refused payment. The conduct of the people in the country districts was deserving of the highest praise.

Fred Boyer, a teacher in the Stivers High School, was on Main Street when the water came over the levee, and describes its progress in an account written at that time:

This morning it was still raining and as the cars were not running I started to walk to school (Stivers). I heard stories on my way down that shops were not running, that Main Street was under water, etc. Only about ten or fifteen teachers and fifty of the pupils came, so after 8:30 we decided to close school. * * * * The fire-bell rang and the whistles blew as a warning. Six of us walked down to Main Street. St. Clair was covered to a depth of several feet near the canal, Main Street was covered south of the railroad. Several of us had gotten about as far north as Fourth Street at just about 9 o'clock, when a man came galloping down the street on a horse, a tall, gaunt, ungainly figure, waving his hands in the other direction and crying "The levee's broke, the levee's broke." The crowds started hurrying the other way, and street cars hurriedly started backing (south on Main Street). A company of colored militia marched up the street from the south. In a moment the water was rushing down the gutters and spreading across the street. (The gutters were full and I could see the water coming down Main Street in a wall about six inches deep in the center of the street). We went back up Fifth Street and it was already coming out Jefferson. * * * * Down St. Clair Street (from Fifth) we could see a great current in the water. We went up the railroad and Wyandotte Street to Third Street and the Canal down which the water was coming like a river. It was washing across St. Clair Street in a mighty current, and just beginning to flow into the Library. We looked up Third Street and it was already across between Wayne Avenue and the Railroad, so we retreated to Fifth Street, came back to Third at Bainbridge and found the water just about to wash over the Pennsylvania tracks and had to hurry to beat it up to McDonough Street. As we hurried up the railroad we saw some people climbing out of the window of a little cottage into the water which reached the sill and we nearly got caught at Clinton Street where it was already across the tracks.

When the seriousness of the flood became apparent efforts were made to inform the people of the city. The National Cash Register Weekly of March 26, published while the water was still near its crest, stated:

The continual ringing of church and fire alarm bells, blowing of all sorts of steam whistles, etc., warned the citizens of Dayton Tuesday morning that there was danger of a flood and to seek places of safety. The majority of the people did not or would not appreciate the gravity of the situation and remained in their homes. As a result the larger part of them have had to take refuge in upper stories of their homes, and as a consequence are experiencing great suffering from exposure and for the want of food, water, and heat.

After the water had overtopped and broken down the levees protecting the main part of the city, the rapidity of the rise shut off the chance of escape for most people. The following account, written at the time by Miss Bertha Langstroth, a teacher in the Miami Commercial College, indicates the rapidity of the rise:

I went across the street to the Reibold Building with the office girl, as we thought we could go up higher and see where the high water was. Went up on the elevator, but could see very little for the clouds. Had to walk down, as the elevator had stopped running. When we got down I remarked that it looked as if there was a thin sheet of water on the street up near the monument. The girl thought it was only the way the light struck the pavement, but in a minute I saw great numbers of people on foot and in different kinds of conveyances coming very rapidly toward the south, and before I could get across the street had to step in the water in the east gutter. The girl was afraid of the water and stayed in the Reibold Building.

* * * * About nine o'clock we went upstairs into the office and in a few minutes heard a terrible crash below. Looked down the stairway and saw the plate glass windows had broken in.

Looked out the windows and saw several people caught in the water. Everybody seemed very quiet, there being no screaming or crying or excitement.

Two boys about 16 were near the corner where the fence was around the Reibold Annex excavation. One climbed on the post at the corner and the other started south. He got to the lamp-post at the alley south of the Reibold Building where he held on for a while, motioning for the other to come on, but he shook his head and still clung to the post. The one at the alley then swam across the alley going south and disappeared in one of the buildings. I think the other got across to the Arcade some way.

* * * * Saw some men floating, holding to boards in the whirling water in the cellar of the Reibold Annex, and were very much afraid they must be drowned as they seemed helpless. The current was most terrible there; that on Fourth Street coming west seemed to join the one on Main Street coming south, striking the northeast corner of the Reibold Building. This made it very bad for the men.

Until about noon on Tuesday the water rose very rapidly, but from that time until the crest of the flood was reached at about midnight the rise was very slow.

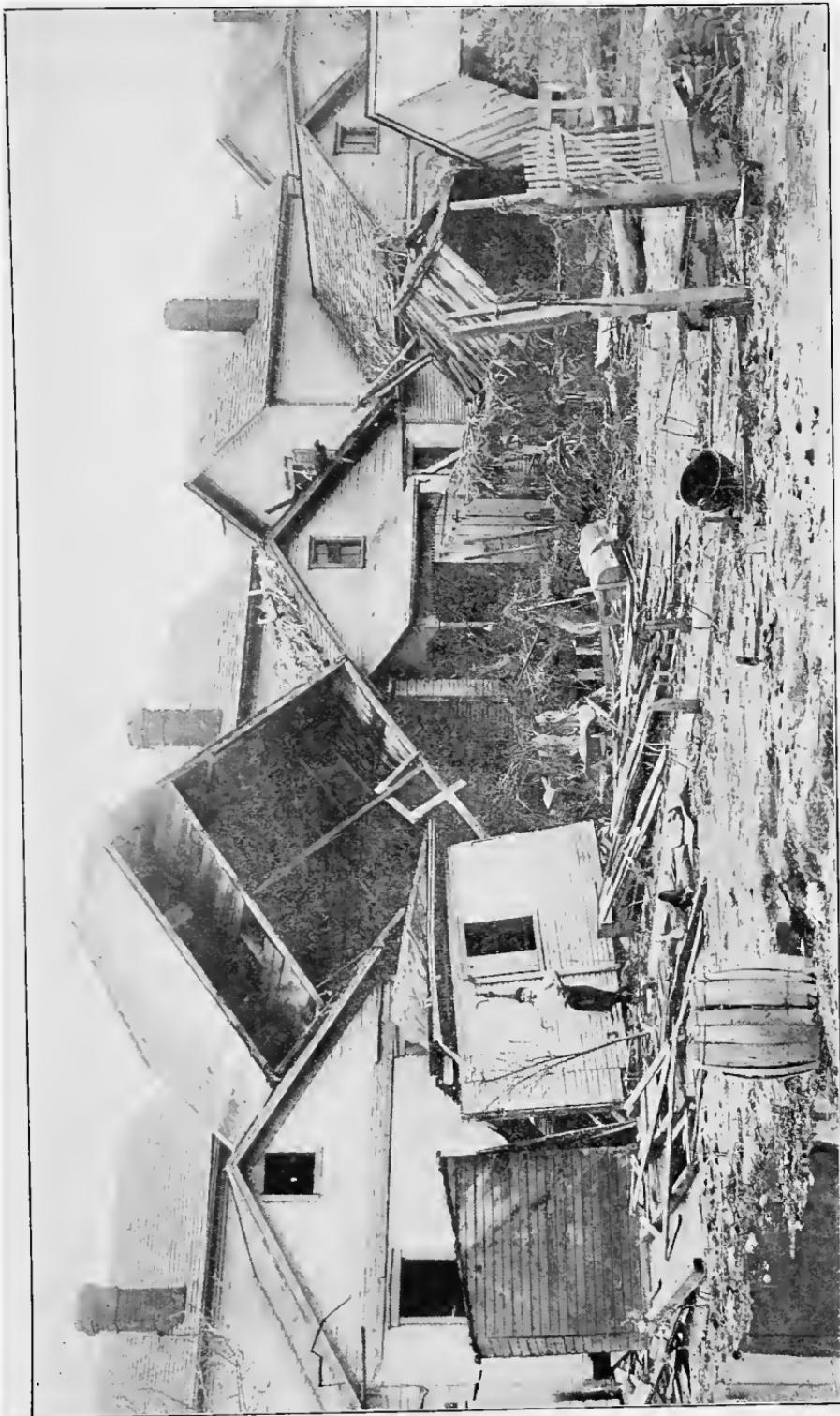


FIG. 18.—DAMAGED COTTAGES IN DAYTON.
The barn and debris lodged on the roofs enables one to judge of the depth of the flood at this point.

All day as the water rose, the terrific current prevented rescue work over most of the flooded area. Each individual who went through the ordeal has his own experience written in his memory, but it would be out of place in this report to try to record them. A single narrative, each important item of which has been checked as to its accuracy, will give an impression of that first day. The occurrences described were repeated in all parts of the flooded city with a thousand variations as to detail.

H. W. Lindsey, who lived at the corner of Vine and Main Streets, between the Miami and Erie Canal and the high ground south of the city, gives the following account of his experiences:

On Tuesday morning, March 25, just before dawn, I was aroused by a call for help from the grocer, Mr. Saettel, and upon looking out of the window was surprised to see that the water had risen and covered the sidewalk. I immediately dressed, waded across the street and offered my assistance. We worked probably an hour waist-deep in water, moving things out of the cellar. Then the water began to pour in upon the first floor, and the rise was so very rapid that we were totally unable to move any of the merchandise to the second floor. At this time the current was flowing east from the river, it evidently being due to backwater. The current was so very swift that I realized I could not cross the street to my home; * * * * About ten o'clock in the morning the river evidently was overflowing its banks at the north of town, and therefore for a time the current down Vine Street was no longer swift, as the current from uptown seemed to neutralize the current due to the backwater. One of my friends taking advantage of this fact launched a canoe, and as he was passing the grocery I hailed him and he offered to take me across Vine Street to my home on the corner of Vine and Main. I hung from a window in the second story and dropped into the canoe.

About this time the water had risen to a depth of about ten feet. There was a small cottage two doors from the grocery in which lived an elderly man and his wife. They had pushed a table against the front door and were looking over the transom, calling to those in the houses nearby to send a boat to their assistance. Only by great effort was a boat able to reach and remove them.

About one o'clock we heard a loud report, and on looking out of the window saw that the grocery, which I had left but a few hours before, was a mass of flames. An explosion in the lower floor had literally blown the top of the building away, and the flames belching forth from the upper story resembled a hot furnace. The concussion shattered the windows in nearby houses. Of seven people in the building, five were saved from any injury. One lad of about eight years was thrown by the explosion onto a roof immediately to the north. Two escaped by means of an improvised raft.

Mr. Saettel's father, a man of about 75 years, was tossed by the force of the concussion onto a floating roof in the middle of Main Street. The roof drifted towards the west side of Main Street, lodging against a barn. * * * * At this time the current was very rapid, the water flowing west towards the river so very strongly that houses and barns were torn from their foundations and floated down Vine Street. One of the houses struck a tree on the west side of Main Street and broke its trunk, 8 or 9 inches in diameter, as though it were a match. There were, I would judge, at least

fifteen or twenty horses frantically pawing at the water as they were carried towards the river. Mr. Saettel was on the raft for probably an hour. His plight was pitiful and our very helplessness nearly drove us to distraction. We had a steel boat tied to our porch, but we dared not embark, and if we had done so, we could never have reached him. As each bit of drift wood, and parts of houses shot by the frail roof or raft with terrific force, it would break off a piece. Eventually the remnants were insufficient to keep the old man afloat, * * * * and finally he sank below the surface.

Even more tragic was the fate of a woman by the name of Mrs. Shunck. She was thrown by the force of the explosion out of the second story of the grocery and succeeded in catching hold of one of the spikes on a telegraph post about twelve or fifteen feet in front of the building. She was torn, lacerated and mutilated almost beyond recognition. Her clothes were literally torn off. * * * * Crying for help she looked beseechingly from one group of helpless persons to another while we fairly shook with pity. She would call the spectators by name asking them to send assistance, which of course was impossible. She evidently had but little strength for as she attempted to crawl up the post, the water being almost up to her armpits, it was impossible for her to raise herself. Two young men did attempt to rescue her. They launched a boat on Vine Street about one square from Main. The current carried the boat so swiftly past the distressed woman that neither of the rescuers had an opportunity to even catch hold of the woman's apparel. Just as the boat shot past her, it evidently struck a piece of debris, as it capsized. Fortunately, the young men were able to reach the barn lodged in front of Mr. T. C. Lindsey's house and to climb over the limbs of the tree which I have mentioned before, to the rear of Mr. Lindsey's home. I cannot say definitely how long Mrs. Shunck hung on the telegraph post, but different people who witnessed that distressing scene estimated that the time was one-half to one hour. * * * * Finally her strength entirely failed her and she sank.

About this time a boat became lodged in a tree on the sidewalk on Vine Street about half a square from Main Street. In some way the oarsmen had lost their oars. There was a very old couple in the boat and one woman with a baby in her arms. Each one seized a limb of the tree and firmly held to it in order to prevent the boat from drifting past Main Street to the river. We attempted to throw ropes to hem, but they were too far distant. We also tried to launch our steel boat and row to them, but the current was so strong that we could not advance at all in either direction. These people were in this perilous condition for about an hour. A boat then came down Vine Street and transferred them to safety. Later in the day the tree was uprooted. One boat load of people attempted for one hour to row south on Main Street to the Main Street hill across the swift current, but had to give up this means of reaching safety.

At this time there were thirteen people in my home. Nine of them were women and four men. Fearing that our house would be set on fire by sparks or floating burning timbers, we put the boat between the porches of our house and the house immediately to the south of us. We then crawled over a roof and a shed to the next house. About this time the back part of the frame grocery was torn from its foundation by the current, and carried against my home, setting it on fire. We dared not go further south to the next house, as this was a small cottage, and it would have been impossible

to have passed on to the next house, the distance being too great. We, therefore, hailed a boat from a back window in the house, and the oarsmen consented to take us to safety. The current in back of the house on the east side of Main Street was not as swift as it was on Main and Vine Streets. The boat would hold but five people, and when after three trips it began to get dusk, the man rowing refused to return for the last three of us. However, we offered him fifteen dollars, and after some entreaties we succeeded in having him return. We rowed east from Main Street to Brady Street, and then went south on Brady across Foraker Street to Apple Street, where we reached dry land. Before we got across Foraker Street we had to stop in order to permit two cottages and one double-story house to float by on their way to the river. I might say that one of the main reasons we desired so anxiously to get out of the house, in which we took refuge, was that there was a pumping station for gas in the rear of this house, in which the main pipe had been broken, and as a result the escaping gas threw the water up into the air like a fountain. We feared that a spark would ignite the gas and blow us up. Within an hour after the last of us reached dry land, my home, and the two houses south of us, burned to the water line. We had moved all of our furniture up to the second floor and then up into the attic. At the time that the house burned the water was but a few inches from the second floor.

The rear part of the burning grocery lodged against the barn in front of Mr. T. C. Lindsey's house. This was on the corner of an alley, and a cottage was wedged in between his house and the house on the other side of the alley. Of course, the barn and the cottage caught fire and the fire was unusually intense, because the barn was filled with several tons of hay. At this time there were, I believe, thirteen persons in the house. To the north of this were two double houses, the second being on the corner of Stont and Main Streets. These people dared not proceed north as they felt they would most certainly be caught in a trap, as there was no means of escaping from the house on the corner of Stout and Main. They therefore decided to proceed south towards the Main Street hill. They crawled over the roof of the cottage wedged between Mr. T. C. Lindsey's house and the house on the other side of the alley. Mr. and Mrs. Osborn were among those in Mr. T. C. Lindsey's home. They had a baby about four months old, and as they had no food for the baby, and the fire was coming towards them, they became desperate. They therefore climbed on some limbs in front of the house to which they passed and reached a telegraph post. Mr. Osborn had the baby strapped in a sheet to his back. They climbed up the post and reached the bars above. Mrs. Osborn sat on one cable and pulled herself along by means of the other. It took her about three-quarters of an hour to make this dangerous journey. Her hands were badly lacerated, and although she was in a weakened condition when she reached safety, she showed remarkable courage and fortitude. As soon as Mrs. Osborn and her husband and baby reached the ground they were taken at once in an automobile to the National Cash Register Co. plant. I might say here that everyone that was rescued in that vicinity was at once taken to the National Cash Register Co.

Mrs. Meyers, a woman of about 45 years, also decided to take the same route to safety. She, however, walked on one cable and seized the wire overhead with her hands, and in this way proceeded towards Main Street

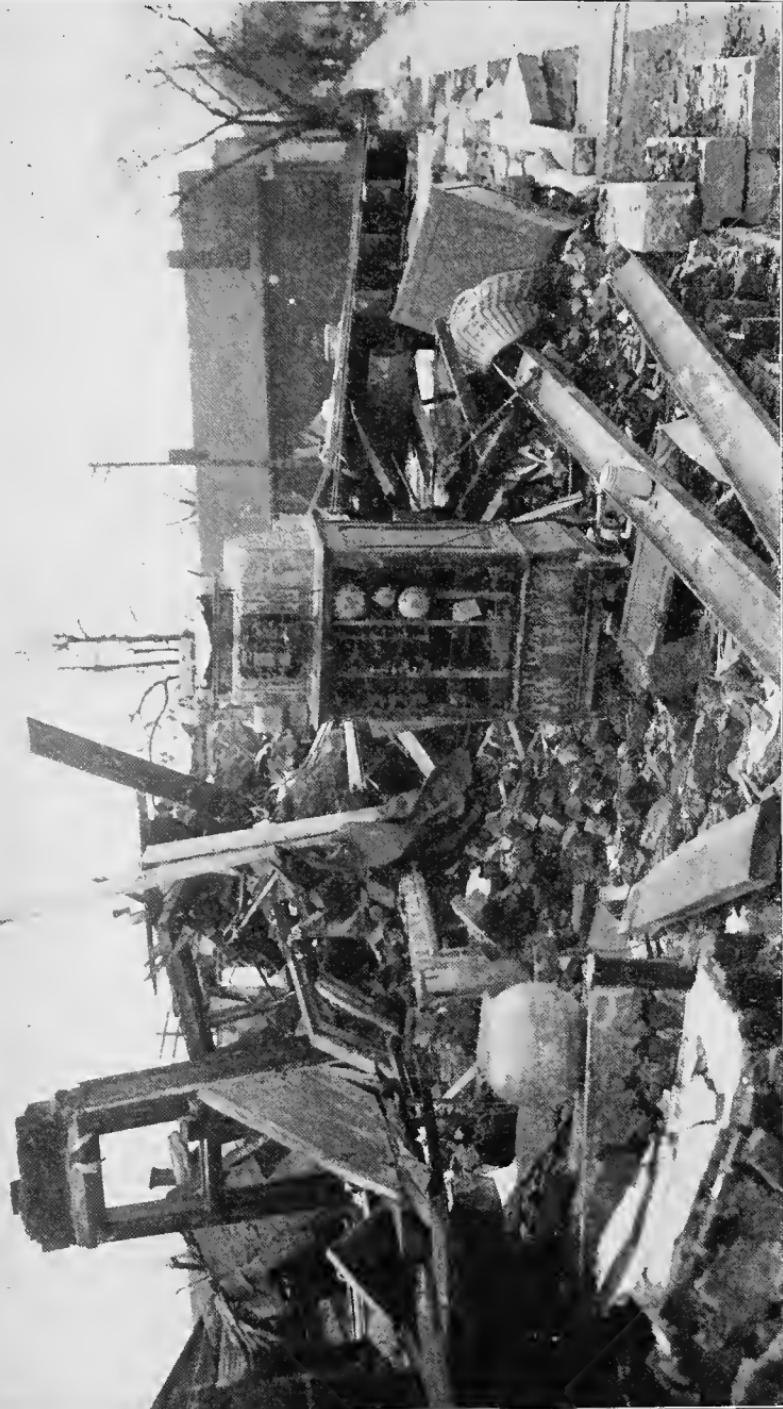


FIG. 19.—REMAINS OF O. G. SAETTEL'S GROCERY, VINE AND MAIN STREETS, DAYTON.

While partly submerged an explosion, followed by fire, destroyed this building.

MIAMI CONSERVANCY DISTRICT

hill. After she had passed about ten feet beyond one of the telegraph posts her feet slipped. Breathlessly we watched her grip firmly to the wire overhead. Due to her weight this wire sagged so that the cable now hung about her waist, and she could not therefore again place her feet upon the cable. With grim determination she went backwards hand over hand to the telegraph post she had just left. Again placing her feet upon the cable she proceeded to finish her journey.

A child of fifteen or sixteen also followed Mr. and Mrs. Osborn's example. The journey was so frightful to her that for three or four days afterwards she was out of her mind. The only real cowardly act which I witnessed during the flood was that of a man who left his wife in her home alone, and reached safety himself by traveling over the telegraph cables.

* * * * *

Someone conceived the idea that flat cars might be loaded with bricks and stones, hauled to the top of Main Street hill, and then released so that their momentum would carry them through the water and against the house which was lodged in the middle of Main Street, and in front of the house in which the group had taken refuge. The flat cars were placed on the tracks of the Ohio Electric and the National Cash Register Co. furnished their engines to haul the cars to the top of the Main Street hill. Each flat car was separately uncoupled and as the hill is very long and steep they ran down the hill at such great speed that each would bump the other car in front. The water was just barely over the top stones and bricks on the first car released. This car came to a stop against the house which, as I have said before, was in the middle of the street. After a sufficient number of cars had been lined up in this manner so that the last car was within easy reach of the dry land, ladders and boards were laid between the cars and men provided with ropes reached the house lodged in the middle of the street. They then threw the one end of the rope to the persons in the group above mentioned, and these succeeded in reaching the house by means of these ropes in the same manner as they had passed between two of the houses, as I have said before. They then crossed over the tops of the bricks on the flat cars to safety.

As I have said before, the house immediately to the north of Mr. T. C. Lindsey's house was a double one. The people residing in the south side of this house were an elderly couple, and the woman had had an operation but a very short time before. Before Mr. Lindsey left his home he attempted to get this couple over to his home. However, the passage from the one house to the other involved great danger, and the woman did not have the nerve to attempt it. I believe that I said the name of these people was Beiser. However, when this double house began to burn the Beisers were forced to desert it, but at this time the home of Mr. Lindsey was partially destroyed and they dared not proceed in a southerly direction. They, therefore, by means of a door or shutter, I believe, passed to the house on the corner of Main and Stout Streets. There was only about five feet distance between this house and Mr. Beiser's home, but this house on the corner did not burn. However, the people in the house at the time fully believed that there was no chance of the house not being burned. They therefore dropped out of the second-story window onto a roof lodged in a tree in front of the house. There were eleven in the party and the roof was not very large. Because of their weight the roof was partly submerged and they were stand-

ing up to their ankles in water. It was dark at this time, so that, from Main Street hill where I was standing, I could not see their perilous condition, in spite of the fact that the flames lit up the scene. During all this time and during all that night the rain came down in a steady downpour. These people stood on this raft, as I learned later, from seven o'clock that evening until almost seven o'clock the next morning. Long ropes were then thrown to them from the ice cream factory on the opposite side of the street, and in this manner their raft was tied against the ice cream factory and the party crawled through a window to the interior of the latter. It is thought that as a result of the exposure of that night one of the party, Mr. Martz, met his death a short time later. Out of the first 72 hours of the flood I slept but four hours, and these four hours were no more than a nightmare, as I dreamed of Mr. Saettel, Mrs. Shunck, and my father. When I did wake up I had no use of my arms as I had been rowing a bit after I was rescued. However, after some rubbing I again regained their use.

At the National Cash Register Co. we were fed for three days, after which time we went to a private family in order to make room for others at the National Cash Register Co. The Commissary Department of the National Cash Register Co. served about 2700 meals a day. The men slept on the floor and chairs, and the women were given cots.

The following letter written during the flood by Dr. J. C. Reeve, to his daughter in New York, will be of special interest to people of Dayton who know of his many years of activity in civic and professional affairs. Its brevity is due to the stress under which it was written and to the fact that the only available paper was some old newspaper wrappers. The original is in possession of his daughter "Mary," Mrs. Robert E. Dexter, who lived across the river in Dayton View during the flood.

At that time Dr. Reeve was 87 years old, which makes all the more remarkable his wading into the ice cold water up to his shoulders. His wife, his only companion, was ill and entirely blind at the time. Her death, a month later, was caused in part by the privations which she suffered during the flood:

Wednesday, March 26th, 10:15.

Dear Lottie:

I am sitting at upper window, Mother's room. Outside a raging torrent pours down Wilkinson Street, a mighty river down Third Street towards west. No human being in sight, no sign of life—silent as the grave. Below, piles on piles of wreckage, a fine piano lying in our yard! Fortunately, yesterday, 7 a. m., I had gotten breakfast at Arcade, oatmeal and coffee. Brought some to Mother.

The danger whistles had sounded before I was up, I supposed for break of levee. I did not care much, did not think of possibilities, not even when water came in yard. I banked on great flood of '66 when this lot—house not then built—stood high and dry, while all around was overflowed.

Now it came so fast I had to hustle to get Mother to the stairs. Now, since last evening it has fallen nearly four inches, and as we passed last night in total darkness (piece of candle two or three inches long), I made an effort to get my lamp from back office. I stripped to the buff, got down to last step, dared not take the next, so cold, room so full of floating furniture that



FIG. 20.—RISING FLOOD AT DAYTON, MARCH 25, 1913, FOURTH AND LUDLOW STREETS.
The rapidity of the rise took the entire city by surprise. Thousands of horses turned loose by their owners were left to struggle for themselves, but few reached high ground.

I could not have made my way through it to the lamp. I was in to my arm-pits! We have a good supply of crackers, a few nuts, a few apples. This morning young men from roof on house next west gave us coffee. Mrs. S. J. P. could reach to them and they to us, eggs and shredded wheat. We have no water, no light, no salt for egg, no telephone connection, no cars, no papers—nothing! Yes, we have natural gas and know how to appreciate it. Neither one next door has it. I boiled an egg soft for Mother, first thing she has kept down. Have some hard-boiled for my dinner.

Mary, we know, is worrying fearfully. We can get no word to her or from her. The front and side of our house is a raging torrent—a sea up to Callahan building. Two street cars stand in front of old Winters' house, water just over the tops of their windows. Inside house, water went over mantels—you know the rest! All night in the darkness the crashing and creaking of furnace pipes in cellar, the banging of furniture floating about below. I could not sleep—do you wonder?

Pitiful to see the horses swimming for their lives; no foothold for them. Four yesterday, and now one has just struggled along and been swept down Third Street.

3:00 p. m. Five hours, water evidently falling. Yesterday at 3 reached highest, just cleared globes of electric light; was there when night closed. Now, two-thirds of the lamp post is visible.

Still two currents rage and swirl and eddy along, one from North Wilkinson, the other from East Third Street, joining forces here. They have swept a long section of board fence and placed it right across this corner, so shielding the corner of house, sending one down West Third, the other South Wilkinson. But for this, I don't think I should be writing this now! I dined on a hard boiled egg and two crackers, Mother on soft boiled egg and a little of the coffee, black, no sugar, no milk — neither attractive nor appetizing. We glory in our fire, and just think what a find! A teakettle full of rain water on bathroom stove and forgotten! Now we can drink! You have to get down to bedrock to appreciate such a find as that! I have lain down a good deal; slept none, but am very tired. I will sleep better tonight; the noises have all stopped and I can close my eyes with the firm assurance that the house will be standing in the morning.

Two men in boat and canoe have passed several times, but did not appear anxious to find out if anyone wanted anything. It rains by times, just to make it more cheerful! All is still, quiet, desolation, and ruin! Your mother is a wonderful woman—not a word of complaint or fear has she uttered, not even one of anxiety.

5:00 p. m. As if one calamity were not enough, for half an hour I have been watching the flames of a fire, the highest, finest flames I ever saw. A man in canoe says it is east of the Beckel. Where will it stop? Night is falling. Good night.

Thursday, 9:00 a. m. Went to bed saddened by beating rain against windows, by glare of light from flames up Third Street. By fact that we had lost our comforter—natural gas would burn no more! Had a long, sound, refreshing sleep; wakened by light streaming in, rushed out to look up stream and see the fire blazing up—great tongues of flame. The whole block must be burning. That was 3:15 a. m. Another good sleep; wake at 6, driving snow, all, everywhere white where snow could rest. Outside, all water, but moving very sluggishly now. Top of fence just visible; no sign

MIAMI CONSERVANCY DISTRICT

of life; all desolation and ruin. I know the meaning of the words now! The Taylors, next door west, called us—did we want anything? Yes, coffee. They made us a pot; by long reaching, both sides, we can just get to each other. They sent sandwiches, too, which E. cannot eat, and I do not want. I had cup of coffee, then a raw egg beaten up with whiskey and a little water. I was glad to give the T's whiskey. I have plenty—thanks to J. A. McM.

Then next for fire. Got with difficulty some of the bricks out which block natural gas; broke up paper boxes and few thin box tops! Oh! if I had hatchet or axe; there are book shelves plenty, fuel plenty, but efforts to break and pull show me how feeble I am. I just had to lie down.

9:30 a.m. Sitting here at window saw rapidly coming down East Third Street a boat—man and woman in stern saluting with hands; window hard to get up. Just had time to hear the shout: "Mr. and Mrs. Penfield." He called, "Do you want anything?" I said, "No, not much," and they were gone. Now, they live a few squares from Mary. I hope they will give her word. Evidently they were in doctor's office down town, imprisoned, just getting home. Our other neighbor, Patterson, is at his office; Mrs. P. shut up here. I have drunk a little more hot coffee, but mouth and throat are so dry, I cannot eat. Next!

11:30 a.m. Sky cleared. Sun shining. Can see our yard where uncovered by wreckage. Water all out of front room, but several inches of slime and mud prevent my going to foot of stairs. Furniture piled in heaps in front and towards bay window. Down office stairs; back office not yet clear of water; furniture piled in heaps. Think by night I can get lamp. Boats pass often now; have brought food for men in Y. W. C. A.

4:45 p.m. Thursday. Things clearing up; skies brighter; sunshine sometimes. Two offers to take us to Dayton View, one by boat from Dr. Henry, next from Red Cross. Mother refused to go.

Men walking on tracks. Water just to ankles. Inspecting track, I suppose. We have done well enough for food. The Taylors sent in big piece of bologna, fresh bread, coffee. Mother can eat nothing. Drinks coffee. What we want most is milk for her. At 4 I stripped and went to the lower regions, the office below; there is a shorter word! Got the lamp; coal oil can gone; got hatchet; have cut up some bed slats and have more, so fuel is provided for. All floor below, everything covered with mud, slime—so sticky can hardly get feet out of it. Such a sight below! Furniture overturned—piled in heaps.

Dr. Huston, in Red Cross, offered to take us to Dayton View—this, the second offer—Mother refused to go. He promised to get word to Mary.

Friday, 3d. Night passed. Fourth day dawned. My toilet—rub face with wet end of towel. Great disappointment last night. Lamp, that I made such a perilous trip to get, would not burn! Could not sleep; thoughts of this, near and remote, on us and others in city of Dayton, kept me awake hours. This morning shows streets and sidewalks are clear. Now, 11 a.m., have talked with friends in street. A man from next door got in by ladder from roof to window; he has knocked book shelves up.

Dr. Evans has brought from depot a bucket of coal—so we are well off. Mrs. P. has given bouillon cubes; next door evaporated milk. Mother will not drink it.

I have been down. No imagination can depict the ruin, the wreck. Mud, sticky mud, pulls rubbers off. Piano overturned. Everything upset, and wrecked. Sun shining now—glorious! A trip down to get water, and I only just got back; dropped on floor and lay a good while before I could get up.

Friday, third day, evening approaching. I cannot write much today. Have had fire all day and natural gas promised for tomorrow. Wish you could see me. Went with great difficulty to kitchen pump for water; just reaching stairs when narrow board underfoot turned and I went down into slime. You should see my clothes. I am faint, mouth and throat so dry I cannot eat.

Streets full of people. Have just had word that Charley is at Lebanon in hotel. Am told that city is under martial law; see lots of badges on street. But how fine is the sunshine all day. Mother keeps about on her feet. How she lives I cannot imagine; she eats so little.

Saturday, 10:00 a. m. Soon after I wrote last Robert came with wagon to get us to Dayton View. I got downstairs, but had to be lifted into wagon. Dr. Henry fortunately came at same time and he carried Mother down and over the slimy, slippery steps. We rode, my head lying in one young woman's lap; Mother's in another. Water too deep in places for carriage. We got here safely. Oh! the luxury of washing face and neck, and of hot milk! Dayton View is a huge relief station; school house headquarters, full and more coming. Good organization; military; no going about without pass. Our rescue came none too soon. I feel certain that I could not have got through another night. I have now for memory the recollection of a great calamity, second, perhaps, to the Titanic, but to none other.

With love to all,

FATHER.

The following account, by a Bell Telephone employee who was marooned in the Exchange at Dayton, indicates the part played by the telephone during the flood:

Owing to the fact that rain fell for several days previous to the dreadful climax, considerable apprehension was felt by many people in touch with the situation. Mr. E. T. Herbig, traffic chief of the Bell exchanges, had instructed his chief operators to keep him fully advised at all times of the day and night of anything out of the ordinary which might possibly occur. The conditions becoming alarming from the reports received by the operators, Mr. Herbig was called at 3:50 a. m. on the day of the flood and promptly reached the office. * * * * Observing that the night force would be unable to cope with the situation, one of the traffic men ordered taxicabs and busses to bring as quickly as possible to the office all employes within possible reach. The regular night force of girls was thus increased to twenty-six.

The abnormal situation above mentioned was due to the fact that over the entire city alarms in the nature of fire bells and factory whistles were being sounded, warning people of the approaching disaster and causing them to communicate with each other. The story they told was that the levee in North Dayton and Riverdale had already broken, and that the levee protecting the downtown district and the West Side would probably break soon. Hence, the reader can imagine the almost constant use of the telephone in warning and advising friends of the danger about to occur. In fact, by six



FIG. 21.—MILES OF TELEPHONE LINES WERE DESTROYED.

o'clock the water began to run down Ludlow Street, in front of the exchange. It was rising in our basement where our batteries and charging apparatus are located. The switchboard was ablaze with lights, and as a precaution against fire the main fuse was removed at 9:20. Thus all means of communication over the telephone in all sections of the city were severed.

* * * * With twenty girls and fourteen men trapped as we were in the building, a resolution was made at the start that every girl and every man would stick together and contribute what she or he could to help along, no matter how serious the situation grew. * * * * About four o'clock in the afternoon the matter of food supply for forty people claimed our serious attention. Mr. Whitten finally conceived a scheme which later proved to be our benefactor. A cord was thrown across to the Y. M. C. A. building upon which a basket was pulled back and forth as needed. By this means we were able to secure at about half past five, forty sandwiches, which was our total food supply on the first day. * * * *

Early next morning (Wednesday) the windows were approached with a feeling of hope that the water had begun to recede, but it was stationary at its maximum depth of twelve feet in Ludlow Street in front of the main exchange building. During the morning nothing was received to eat or drink, as the food supply at the Y. M. C. A. was limited, as they themselves were housing about 300 people. * * * *

About ten o'clock on this morning the information had been given to us that a fire was raging just west of the river in Miami City—soon afterward it was discovered that a fire had started on East Third Street, in the block between Jefferson and St. Clair Streets, the second block from the Bell office. This did not cause a great amount of excitement at the time, the chief interest of our people being centered in the turbid, seething waters carrying furniture, fences, parts of houses, horses and other live stock down Ludlow Street. * * * *

During all the day Mr. Bell was in constant communication with Mr. Reed and Governor Cox, keeping in touch with the situation. As the afternoon progressed, from the roof of our building the fire seemed to be spreading and growing fiercer. As darkness approached, the waters having receded to a depth of about four feet, the fire began to sweep the entire square in which it originated. With a fierce wind blowing, and nothing to combat it, it seemed that this horrible element was destined to destroy the entire downtown business district. Shifts of two men were organized to go to the roof at 20-minute intervals and secure information from the Algonquin Hotel and the Y. M. C. A., who in turn had received it from the people on the top of the Arcade and Phillips House, as to what progress the fire was making.

It seemed a godsend when that sleetting, cold rain began to fall, thoroughly wetting the roofs of many business places and residences, great numbers of which would undoubtedly have been ruined had the night been dry with the strong wind. This was the worst night of all for those confined in the building. * * * *

The night having passed and the morning (Thursday) having dawned cold and bleak, snow being on the roof, the waters still slowly subsiding, the necessity for food became most pressing. It was at this juncture that one of our men volunteered to strike out and return with whatever he could obtain which might relieve the situation. A case of grape fruit and some canned goods were the results of his efforts. They were received in a most

welcome way. * * * * During the day more provisions were obtained so that further suffering was avoided. * * * * The day and night passed more quickly on account of the feeling of assurance that on the following day (Friday) the building could be left. This the operators did at about 9 o'clock and hurried to their homes, having been confined three long days and nights.

On Wednesday Governor Cox had ordered Mr. Bell to use every possible means of locating General George H. Wood and bringing him to the exchange in order that the Governor could communicate his orders to him. After considerable effort he was located doing valuable rescue work, having met with an accident by his boat capsizing, nearly costing him his life. General Wood at once reported to the Governor by telephone from the test panel. Immediately upon orders from the Governor the first steps were taken to establish military authority and the city declared under martial law. Arrangements were made by the general to establish his headquarters on the second floor of the Bell telephone building, and it was from this point that all operations in bringing about an efficient organization, and all directing of important movements were made. Headquarters were maintained in the Bell telephone building for about a week, and no effort was spared by all to afford every possible aid to the general and his staff in bringing about a condition of hopefulness out of one of chaotic confusion.

The Flood at Hamilton

Similar conditions to a greater or less extent existed in all of the cities of the valley. In proportion to its size the city of Hamilton probably suffered more seriously than any other. The following account of the rise of the flood there is condensed from a description given by a reporter of the Republican-News:

On Monday evening, March 24, about five o'clock in the evening, there was a noticeable increase in the waters of the Great Miami, and the gage showed a rise of almost three feet during the next three hours.

During the night the river rose steadily and at seven o'clock the following morning the gage showed a stage of nineteen and one-half feet, within four feet of the stage of '98. Shortly after eight o'clock on the morning of Tuesday, March 25, in a hard downpour of rain, a Republican-News reporter left the office to make a round of the flood district.

The basement of the Ohio Electric Power plant had about five feet of water in it. On Pascal Avenue, residents of Peck's addition and the adjoining district were watching others try to rescue members of their family and their live stock. Houses were then mostly inundated, the levee at the outlet of the Crawford's Run sewer was slowly being washed away, and conditions were such as had not been experienced there for fifteen years. On South Avenue the representative of the Republican-News met Charles Smith of the West Side Motor Company, who was viewing the flood, and together they motored to all parts of the city. The river in the lower Second Ward was rising with amazing rapidity, and a street that was dry one minute would be covered five minutes later. They crossed the river on the Columbia Bridge to Millikin Street on A and then to B Street. Conditions were the same everywhere. Mr. Smith then drove the car to the Cullen and Vaughn lumber yard. When he had been there within an hour previous

B Street at that point was dry, but it was now covered with from one to several feet of water. Workmen were trying to anchor the lumber so that it would not float away, but their labors were futile. The shops over the city were beginning to close at this time, but no one thought of the calamity rushing upon the city.

Returning to Main Street at nine o'clock, they drove again to High and Main Street Bridge, where hundreds of people were watching the flood. The gage showed a rise of over two feet since seven o'clock. The trip was then extended to Front Street and north on Front to Buckeye Street to Second and then to Black Street. On Front Street the Hydraulic was overflowing onto the street, and quantities of debris and a shed floated by in the river. The shed crashed against the bridge. Returning to the automobile, it was found to be in several inches of water, where ten minutes previously it had been almost a foot out of water.



FIG. 22.—HIGH STREET, HAMILTON, AT DAYBREAK
MARCH 26, 1913.

Taken when flood was near crest. The depth may be judged from the street lamps which just clear the water surface.

A few minutes later they drove back to Vine Street and out on Vine to Fifth Street. Stopping the car there they proceeded north to the Pennsylvania Railroad trestle. Water at that time was touching the ties of the trestle. Railroad men were deserting their places and hurrying down apparently to safety. It was feared that every minute the trestle would go down. All trains had been stopped on both the C. H. & D. and the Pennsylvania, and a switch engine was refused passage south of the north line of the Pennsylvania trestle. A terrific roaring to the north and east sounded as though a tidal wave was rushing and crushing down the valley. Water was overflowing the banks of the reservoir. The automobile was then driven

rapidly to Front Street. There was water everywhere. Every street from Fifth to Front had become a rising rivulet which was soon to be a raging torrent of water carrying debris, houses, and human beings. Returning to Front Street within three-quarters of an hour after they had left it, it was found that the water had risen over a foot and that frightened people were hurrying to and fro, unable to appreciate the impending danger, and unable to conceive a flood in Hamilton that would get into their homes.

The flood at that time, shortly after ten o'clock, was on Front Street, the north end of other streets to Fifth Street, but had not yet got below the Niles Tool Works except on Fourth Street. The water, however, had flowed down Fourth Street and down Market Street, and was flowing into the cellars of the plants of the Bender Company, the Hooven, Owens, Rentschler Company, the Republican Publishing Company, and was making straightway for the river. The district between Market Street and the Niles Tool Works, and between Front and Fourth Streets, was at that time an island. However, it was not destined to remain long as an island. At this hour the police had closed the High and Main Street bridge, and refused to allow anyone to go over either way. Thousands of people were on each side of the river.

The Republican-News at that time had decided that it would be impossible to publish a paper on that day, and the energies of the force was put to saving stock and valuable paper in the basement. At eleven o'clock it was impossible to get to the plant from High Street. Market Street was a raging torrent, as were also Fourth Street and Front Street. The water was flowing down Fifth and Dayton Streets with unprecedented rapidity. Men were hurrying about in wagons searching for boats to rescue people in the lower end of the Second Ward, but every available boat in the city had been pressed into service, and hundreds of automobiles were being rushed about the city taking people to their homes.

At 11:30 o'clock the water began running down Second and Third Streets, and began threatening the entire north end of the city. The district known as Italy, near the American Can Company plant, was flooded and the real damage of the rising waters was beginning. In all parts of the city people were hurrying to the groceries and meat stores laying in supplies of edibles. Fifteen minutes later there was a foot of water on Third and Second Streets, and it was difficult to cross either thoroughfare because of the strong current. By noon there was not a dry place in the territory from Sixth Street to the river and north of Market Street. From one to five feet of water covered the entire district, and the Second Ward was getting the back waters of the river. Residents in the inundated districts were carrying their furniture to the second floors, always believing that every minute would see the flood beginning to recede. The impression prevailed in the early hours of the flood that a reservoir had burst and that the waters would subside as quickly as they had risen. About 1:30 o'clock the river had reached such a stage that the waters were rapidly and noisily creeping over High Street. The basements of all the stores on the north side of High Street were flooded long before this however, and many thousands of dollars of damage had been done. Easter stocks which were still in the basement had been ruined. The water rose rapidly until about ten o'clock at night. Stages varied in different parts of the city according to the elevation of the district. The continuous rain, the strong wind, and the rushing waters kept the city in a state of terror.

Shortly after ten o'clock at night it was noticed by those who had kept hourly and half-hourly measurements that the rise was not as rapid as it had been an hour before. It was noted that at one o'clock in the morning of Wednesday, March 26, that the waters were at a standstill. There was little change in the stage until about three o'clock in the morning when the least perceptible decrease was noticed. This fall in the waters continued at an increasing rate from that hour, and at six o'clock on the morning of Thursday, March 27, it was possible to wade along parts of North Third Street. During that day, and until now, the water has receded until the Miami River, five days ago leaving its banks and carrying death and destruction along the Miami Valley, has about resumed its peaceful whirl down the old channel.

THE PASSING OF THE FLOOD

Along the lower Mississippi floods arrive and depart gradually. When the weather observers along the river report high water at Pittsburgh or Cincinnati, with promise of high water at and below Cairo, the levee system is put under careful guard. Day after day the water rises, a few feet a day at the lower stages and a few inches a day at the crest. The levee system is in danger, and for days or weeks the population behind the levees live in suspense, not knowing whether the levees will hold. When a break occurs the water rushes through in enormous volume, but great areas of low country serve as reservoirs, and days pass before water from the break covers the whole basin. As a rule very few lives are lost, and most live stock is saved. Then follows a long period of inundation, as the water falls a few inches or a few feet each day.

Floods in the Miami Valley are as precipitous, both in coming and going, as those on the lower Mississippi are slow. At Piqua people went to sleep at night and were caught in their houses. At Dayton clerks went to town in the morning and were caught in the stores. After three days of flood the river was back in its channel through the cities, except for a few particularly low areas, such as the southeast part of Piqua, known as Shawnee, and the south part of Hamilton, known as Peck's addition, where the water remained for about a day longer.

A. M. Kittredge was marooned in his residence at 217 North Ludlow Street in Dayton. While waiting for the flood to pass he performed a valuable service by recording the height of the water at half hour intervals, from about noon on Tuesday until about ten o'clock on Wednesday forenoon. The diagram, figure 23, indicates the rise and fall of the flood crest. It will be noted that at this point the rise from 2 p. m. on Tuesday until the crest near midnight was less than a foot. At the Miami Commercial College Mr. Pickering, measuring the water on the stairway every hour, noted it as reaching the crest at 1:15 a. m. During the following hour it fell half an inch, and between 2:15 and 3:15 the fall was about $1\frac{1}{2}$ inches. Near the east margin of the flood one observer watched the progress of the water on a gate at Garden Street. From noon until dark the rise here was slow, and on the following morning the water was approximately two inches higher than at dusk the night before.

Figure 23 also indicates the rise and fall of the flood crest at Hamilton.

By Wednesday evening relief work in Dayton had been organized at the plant of the National Cash Register Company. An organization of the company's employees had been effected, with particular men assigned to the caring for heat, water, light, medical

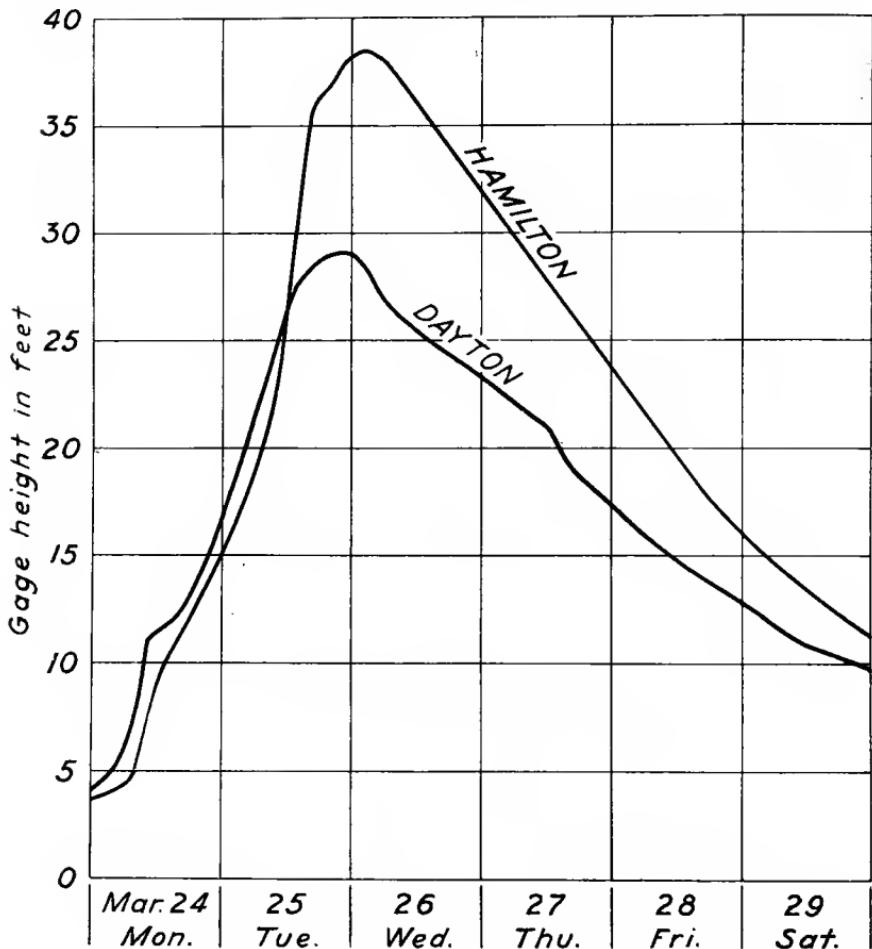


FIG. 23.—DIAGRAM SHOWING THE RISE AND FALL OF THE MIAMI RIVER AT DAYTON AND AT HAMILTON DURING THE FLOOD OF MARCH, 1913.

and housing, finance, provisions and supplies, boats and automobiles, and vigilance police. Until the flood waters had passed this group could work only along the southeast margin of the flooded area.

Wednesday morning one of the telephone operators at Phonetown, a station on the trans-continental telephone line a few miles north of Dayton, drove to North Dayton with a "test set." There he

FIG. 24.—MORGUE AT FACTORY OF NATIONAL CASH REGISTER COMPANY.



MIAMI CONSERVANCY DISTRICT

found Major Leon Smith of the Ohio National Guard organizing a citizens relief committee, and by means of the test set put him into telephone connection with the Adjutant General's office at Columbus at 12:40 p. m. on Wednesday.

On Thursday, March 27, a number of citizens in the part of South Dayton which was not flooded held a meeting and organized a citizens relief committee. John H. Patterson, president of the National Cash Register Company, was made president, and W. F. Bippus, secretary and treasurer. Governor Cox immediately notified the militia of Mr. Patterson's selection, and ordered it to comply fully with the general policy outlined by the committee. Adjutant General George H. Wood of the National Guard gave orders on the 28th that Mr. Patterson's orders would "be honored by all posts of the National Guard." The governor also appointed H. E. Talbott as Chief Engineer officer of the district.

On Tuesday night at Piqua, and on Thursday afternoon at Dayton reports were circulated that the Loramie Reservoir had broken and would flood the cities to a still greater depth. These reports caused panics, and many people fled to higher ground.

The work of the Ohio National Guard during and after the flood was of very great benefit. Three of these reports are given here as furnishing accurate records of occurrences from as many different viewpoints. The report to the Governor of Brigadier-General George H. Wood gives such a clear impression of conditions in Dayton that it is reproduced here in full:

* * * * *

I was in the City of Dayton on the morning of March 25, having gone there to conduct an examination for commissions, and had started for the depot a little after seven o'clock a. m. to take a train for Columbus, when I learned that the civil authorities in Dayton had called out the available organizations of the Ohio National Guard to assist them in the work of rescue. I at once went to the City Hall and conferred with the highest civil authority present at that time and place, and received from him a verbal official request to mobilize such troops of the Ohio National Guard as were available for duty. I then sought information respecting the situation from various sources, and was informed that the river had been rising rapidly, that large portions of North Dayton and Riverdale were submerged, that there were breaks in the levee along Mad River which had let the water in over portions of the eastern and southern parts of the City of Dayton, and that the railroad bridge at Sixth Street was damming the river and threatening the levees on both its sides.

At 7:45 a. m. a detachment composed of men of Companies G and K, Third Infantry, reported to me, and at the request of the police department, were by me sent north along the levee to collect the boats at White City and Y. M. C. A. Park. Shortly after, about eight a. m., Captain Deaton and a detachment of Company C, Ninth Infantry, reported, and were sent to assistance of Sergeant Johnson of the police force at the Keowee Street bridge for duty in North Dayton. Up to this time I had seen none of the civil authorities except Sergeant Fair of the Police Department, but a little after eight o'clock I met Director Dodds of the Department of Public Safety, and acted with him until all work was stopped by the flood.

Director Dodds stated to me that the Sixth Street railroad bridge was a terrible menace, and requested that it be blown up. A search was made for dynamite, but none could be located.

The reports from Riverdale were very alarming, and I went to the north end of the Main Street bridge with a few National Guardsmen. I found Riverdale north of the bridge completely submerged and the water close to the top of both sides of the levee along Lehman Street. There were in the neighborhood of fifty men and women on this levee sightseeing; and I at once ordered the levee cleared. This was most fortunate as in a very few minutes the water from Riverdale rushed over the drive-way just west of the bridge and cut off the levee. It would have been impossible to escape from the levee, it being broken at the west end near the old hydraulic. Rescue work was then being done in boats in the lower sections of Riverdale, which was already submerged, but after the water broke over the drive-way



FIG. 25.—BRIDGE OVER MIAMI AND ERIE CANAL IN DAYTON COVERED WITH FLOOD WRECKAGE.

it made such a current across Main Street that it was impossible for boats to reach the bridge. To make a safe port a rope was fastened near the Bellevue Apartments and then carried diagonally northwest across Main Street by the heroic efforts of firemen and National Guardsmen, the water being shoulder deep and very swift, and fastened to a telegraph pole. All boats were ordered to keep on the northeast side of the rope, but, unfortunately, two men in a boat pushed under the rope, were caught by the current and swept over the drive-way into the main channel of the river. One never appeared again; the other caught in the branches of a tree about twenty-five feet south of the bridge. Two most heroic attempts were made by officers and soldiers of the Ohio National Guard to rescue this man, but both failed.

MIAMI CONSERVANCY DISTRICT

In the second attempt, Battalion Sergeant Major Edward L. Harper, Third Ohio Infantry, lost his life.

At about 10:30 the current through Riverdale had become so swift that rescue work had to be given up, and I returned to the south end of the bridge. The river had risen to the top of the banks and water was pouring down Main Street.

At this time I had with me Lieutenant Matthews, Third Ohio Infantry, and eight enlisted men, and with this force I determined to try and reach the City Hall. Single file and holding hands in the manner I had used in the Philippines in crossing dangerous rivers, we started down the west side of Main Street with myself at the head of the line, and had reached the residence of Dr. C. W. King, when Private Coble, Company G, was torn from the rear of the line and swept past us by the current. Fortunately, I was able to seize him and, although carried off my feet, the line back of me held and Private Coble was rescued. Seeing that it was impossible to proceed further, the entire detachment took refuge in the homes of Dr. King and Mr. Oswald Cammann. This was a little after 11:00 o'clock on Tuesday morning. The water kept rising rapidly all Tuesday afternoon and evening. At about one o'clock p. m. we were driven by the rising water to the second story of the house.

The water continued to raise until 12:00 o'clock midnight, when it remained stationary for a time, and then slowly rose until 2:00 a. m. Wednesday morning, when it attained its greatest height. From 2:00 a. m. the water fell very slowly, but by daylight the fall had become noticeable.

During the night four distinct fires were visible, and the danger of fire was added to the terror of the water. Dawn broke and disclosed a dull, over-cast sky with frequent heavy showers. About nine o'clock the northwest corner of Steele High School fell, the foundations having been washed out by the heavy current sweeping around the corner.

About two o'clock p. m. (Wednesday) a canoe containing two men, afterwards learned to be Frederick Patterson and Nelson Talbott, was paddled up Main Street and then south after rounding the Monument, this being the first sign of life on the main street of Dayton in twenty-four hours.

The water fell steadily but slowly during Wednesday, and the north-south current on Main Street was noticeably less violent, but the east-west current on First Street was running like a mill race.

At five o'clock, I secured a boat from the Main Street Engine House, manned by Captain Koepnick and Fireman C. W. Heiser of the Dayton Fire Department, and made an attempt to reach the central part of the city. The current running on First Street caught the boat, swept it toward the Dayton Club where it struck a submerged hitching post, which sank the boat. We with difficulty escaped by swimming, and obtained refuge in the Dayton Club.

Shortly after dark a fire broke out at the corner of St. Clair and Third Streets, and from the roof of the Club we could see it rapidly spreading westward.

At 12:00 o'clock that night I succeeded in wading to my home, 121 North Main Street, the street being brilliantly illuminated by the glow of the fire on Third Street.

To give an idea of the depth of the water and the terrific force of the current, I was separated from my family for thirty-six hours and not able to reach them or ascertain their fate, although within one city square of my home the entire time.



FIG. 26.—THE BURNT SECTION OF THE DAYTON BUSINESS DISTRICT.
Fire added to the havoc wrought by the flood, and destroyed much valuable property. This view of St. Clair Street shows how the asphalt pavement was torn up by the swiftly flowing water.

At daybreak Thursday morning I found that the water had fallen so that Main Street as far south as Second was practically dry, but the scene of desolation was terrible. The asphalt paving on First Street had been torn from the foundation in sheets. The streets were covered with mud, and huge bars of gravel and wreckage were everywhere. The plate glass windows had been swept from the stores, and the picture of ruin was complete.

The situation was critical, as all civil government had disappeared, and after a conference with Judge Carroll Sprigg of the Common Pleas Court and Judge Roland Baggott of the Probate Court, upon their request, I assumed responsibility and declared martial law. My force consisted of Lieutenant Charles Parrott, Company H, the first man to report to me Thursday morning, Sergeant Hoover, and three enlisted men. I immediately placed guards on the Rike-Kumler Company and ordered all saloons out of water to close.

Being destitute of everything, the question of communication with the outside world was most important. We were completely surrounded by torrents of water and the fire was still raging on East Third Street and threatening to spread to the west.

First Sergeant William Harris, Company K, Third Infantry, O. N. G., Fireman George Nee, and Fireman Huesman, volunteered to cross through the water then surrounding us to the higher ground, and I gave each of them a telegram directed to yourself, and directed them to reach the nearest telegraph or telephone station. Firemen Nee and Huesman made their perilous trips in safety, but Sergeant Harris was caught in the current at Library Park, his boat overturned and he was himself drowned.

There were many brave men in Dayton during this period, but I wish to particularly commend the gallantry of Sergeant Harris, Fireman Nee, and Fireman Huesman.

About 9:00 o'clock, Major R. L. Hubler, Third Infantry, O. N. G., reported for duty and I directed him to go to Dayton View and assume command of that suburb.

A little later in the morning I was notified that the Central Union Telephone Company had a wire working to Columbus, and that you were very anxious to get in touch with me. I at once waded to their office on Ludlow Street and reported to you, as Commander-in-Chief. You placed me in command of all troops in Dayton, directed me to enforce martial law and do everything possible for the lives and property of the people of Dayton. You further informed me that Colonel Charles X. Zimmerman had arrived in the southeast portion of the city with parts of the Third and Sixth Regiments of Infantry, O. N. G., and the Naval Militia, and that Colonel J. H. Patterson was doing glorious work in South Park.

Armed with these instructions I at once went to the Rike-Kumler store, bought the entire stock for the State of Ohio from Mr. I. G. Kumler, placed Captain William V. Knoll, Third Ohio Infantry, in charge, and directed him to issue such food, clothing, etc., as were necessary, taking a memorandum of every issue made by him. Mr. Mays Dodds, Director of Public Safety of the City of Dayton, reported to me on Thursday, and, after a conference, I directed him to devote his entire energies to the rehabilitation of the Fire Department, while I assumed the policing of the city with the National Guard.



FIG. 27.—MUD AND STOCKS OF GOODS BEING SHOVELED OUT OF STORES AND HAULED AWAY. This view was taken in front of the Elder & Johnston department store, Main Street, Dayton. Stores opened for business while the work of cleaning and repairing them was in progress.

About noon I succeeded in reaching Colonel Patterson by telephone, communicated the Governor's orders and directed him to assume command of the southern part of the city.

Colonel Zimmerman was communicated with at the East Telephone Exchange on East Fifth Street, and received similar orders covering the eastern and southeastern portions of the city.

In the afternoon Captain Hapner, Third Ohio Infantry, was located at Fifth and Western Avenue, and placed in command of Edgemont; and late that evening I got into communication with Major L. E. Smith, Third Ohio Infantry, by way of Columbus, and assigned him to the command of North Dayton.

By midnight on Thursday, all portions of Dayton out of water were under martial law and divided into the following districts under the following commanders:

North Dayton—Major Smith.

East and Southeast Dayton—Colonel Zimmerman.

South Park—Colonel Patterson.

Riverdale, Dayton View and Miami City to Third Street—Major Hubler.

Miami City south of Third Street and Edgemont—Captain Hapner.

Central Dayton being under my immediate command.

Thursday afternoon, the water had fallen sufficiently to enable the Fire Department to prevent any danger of fire spreading westward, and the menace of fire thus removed from the central part of the city.

By night fall, Thursday, the water had receded to the southern line of Third Street, but every inch of fall meant additional guard duty, as every store and bank door had been forced open by the elements, and their contents lay open to any marauder.

Between three and four o'clock Thursday afternoon, a corporal and three enlisted men of Company A, Fourth Ohio Infantry, reported to me, being the first troops to reach the central part of Dayton. My entire force Thursday evening consisted of this detachment and about ten or twelve local National Guardsmen and volunteers, part of whom were already on duty at the Rike-Kumler store, Whitaker-Gwinner Co., etc.

As there was no street lighting of any kind, I cleared the streets before night fall and permitted no one on the streets south of First or east of Ludlow Streets. At midnight a riot was reported at the Union Station and I sent Captain Gimperling, Third Ohio Infantry, there with a small force, but the report was without foundation, as most of the reports, during those trying days were.

Between midnight and daylight, Friday morning, the water receded nearly to the line of the railway, and I followed the water and placed guards over the central banking and business sections bounded by Jefferson, Fifth and Ludlow Streets.

The amount of valuable property of all kind covered by our guards that night was very great. At the jewelry store of A. Newsalt, I should estimate that from \$10,000 to \$15,000 worth of jewelry and valuable merchandise was scattered on the sidewalk and in the gutter. I take great pride in saying for the National Guard of Ohio that not a single case of looting was reported as the result of this night's work, although the opportunities were limitless.

At 4:30 a. m., Friday, Lieutenant E. O. Clark, Third Ohio Infantry, reported to me at the corner of Fifth and Main Streets with seventeen men,

from Company A, Fourth Infantry, O. N. G. This was a most welcome assistance as it enabled me to strengthen and extend my guard line before daylight.

At daylight, hundreds who had been marooned in the office buildings and stores began to pour out into the streets. They were directed to keep off the sidewalks and travel in the middle of the streets, and were directed and assisted to places of safety.

At eight o'clock a. m., Colonel L. W. Howard, Sixth Ohio Infantry, reported with eight companies of his regiment, and was placed in command of the central portion of the city.

At ten o'clock a. m. Colonel Vollrath, Eighth Ohio Infantry, with four companies of his regiment, and Colonel E. S. Bryant, Second Ohio Infantry, with ten companies of his regiment, reported. Colonel Vollrath was directed to proceed to North Dayton and assume command there. Before any disposition was made of the Second Infantry, reports of serious trouble on Franklin Street were received, and Major Gale, Second Ohio Infantry, was ordered to proceed there at once with his battalion and establish order. Other necessary details scattered the Second Ohio Infantry, and Colonel Bryant served in Dayton View for a few days until he assumed command of the Miamisburg District.

At noon Friday I went to the National Cash Register Co., where a conference was held with Hon. George Burba, Secretary to the Governor, and Colonel J. H. Patterson. You were communicated with and I was directed to appoint a Citizens' Relief Committee. At 2:00 p. m. a meeting was held in the Council Chamber, attended by Mayor Phillips, other city officials and members of the Council, and a committee from the Chamber of Commerce. I presided over the meeting and appointed as the Citizens' Relief Committee:

Colonel John H. Patterson, Chairman.

Mayor E. T. Phillips.

Colonel Frank T. Huffman.

Adam Schantz.

John R. Flotron, members.

I advised the Committee to organize at once, and stated that I would do all that lay in my power, as Military Governor of Dayton, to assist them.

On Friday afternoon you officially notified me that martial law had been proclaimed over Montgomery County, and directed me to assume command and enforce the law. I at once organized the sub-district of Carrollton, Miamisburg and Germantown, and placed Captain Hughes, Third Regiment Infantry, O. N. G., in command.

The following staff was appointed by me:

Captain Cyrus E. Mead, Adjutant General.

Lieutenant E. O. Clark, Assistant Adjutant General.

Captain J. B. Gimperling, Jr., Chief Quartermaster.

Major D. A. Lynch, Chief Commissary.

Major Frederick C. Weaver, Chief Medical Officer.

Colonel H. E. Talbott, Chief Engineer Officer.

Lieutenant C. W. Parrott, Aide-de-Camp.

At the same time, by General Order No. 4, the city of Dayton was divided into the following military zones, and each zone commander was placed in control of the sanitary and relief work in his zone. Such division was abso-

MIAMI CONSERVANCY DISTRICT

lutely necessary on account of the crippling of telephonic communication and the impassable condition of the streets:

Zone No. 1. North Dayton. Bounded by Stillwater and Mad Rivers. Colonel Vollrath in command.

Zone No. 2. East and South Dayton. Bounded by Mad River, the line of Detroit Street and stretching north from the line of Apple Street as the water recedes, and getting in touch with Colonel Howard. Colonel Zimmerman in command.

Zone No. 3. Central Dayton. Bounded on the northwest by the Miami River, on the east by Detroit Street and stretching south until communication is established with Colonel Zimmerman. Commanded by Colonel Howard.

Zone No. 4. Riverdale, Dayton View and Miami City to Third Street. Major Hubler in command.

Zone No. 5. Miami City south of Third and Edgemont. Colonel Catrow in command.

At this time the following troops were on duty in the City of Dayton:

Ten companies, Second Ohio Infantry—Colonel Edward S. Bryant.

Nine companies, Third Ohio Infantry—Colonel H. G. Catrow.

Three companies, Fourth Ohio Infantry—Major Rell G. Allen.

Twelve companies, Sixth Ohio Infantry—Colonel C. X. Zimmerman.

Eight companies, Sixth Ohio Infantry—Colonel L. W. Howard.

Four companies, Eighth Ohio Infantry—Colonel Edward Vollrath.

Companies A and C, Ninth Battalion, Infantry—Captains Frye and Deaton.

Battalion of Engineers—Lieutenant Colonel John R. McGuigg.

Company A Signal Corps—Captain Kirtland.

First Ambulance Company—Captain Dale Wilson.

Second Field Hospital—Major H. H. Snively.

Ship's Company, U. S. S. Essex—Commander Nicklett.

Ship's Company, U. S. S. Dorothea—Lieutenant Commander Bolton.

The darkness of the streets, the gas and electric light plants having been totally crippled by the flood, and the unprotected condition of all banks, etc., necessitated the most watchful guard duty, and both officers and men responded nobly to the exigencies of the situation.

At an early hour Saturday morning Colonel Zimmerman was ordered by you to proceed to Hamilton and assume command there. This necessitated a change in the zone commander and Colonel Catrow was assigned to command the third zone, and Colonel McQuigg assigned to command the fifth zone.

The Pennsylvania Railroad sent to the City of Dayton a completely equipped work train with sixty-five mechanics, picked men, the cream of the Columbus shop. The firemen reported to me for duty late Friday night, and on Saturday morning the force was divided between the Dayton City Waterworks and the two plants of the Dayton Power and Light Company, and did most efficient service in the work of rehabilitation.

On Saturday, March 29, Secretary of War Garrison and Major General Leonard Wood visited the city of Dayton, making their headquarters at the National Cash Register plant. The General Commanding called upon these distinguished guests and placed at their disposal automobiles so they might have a good opportunity to see the work of destruction and appreciate the situation.

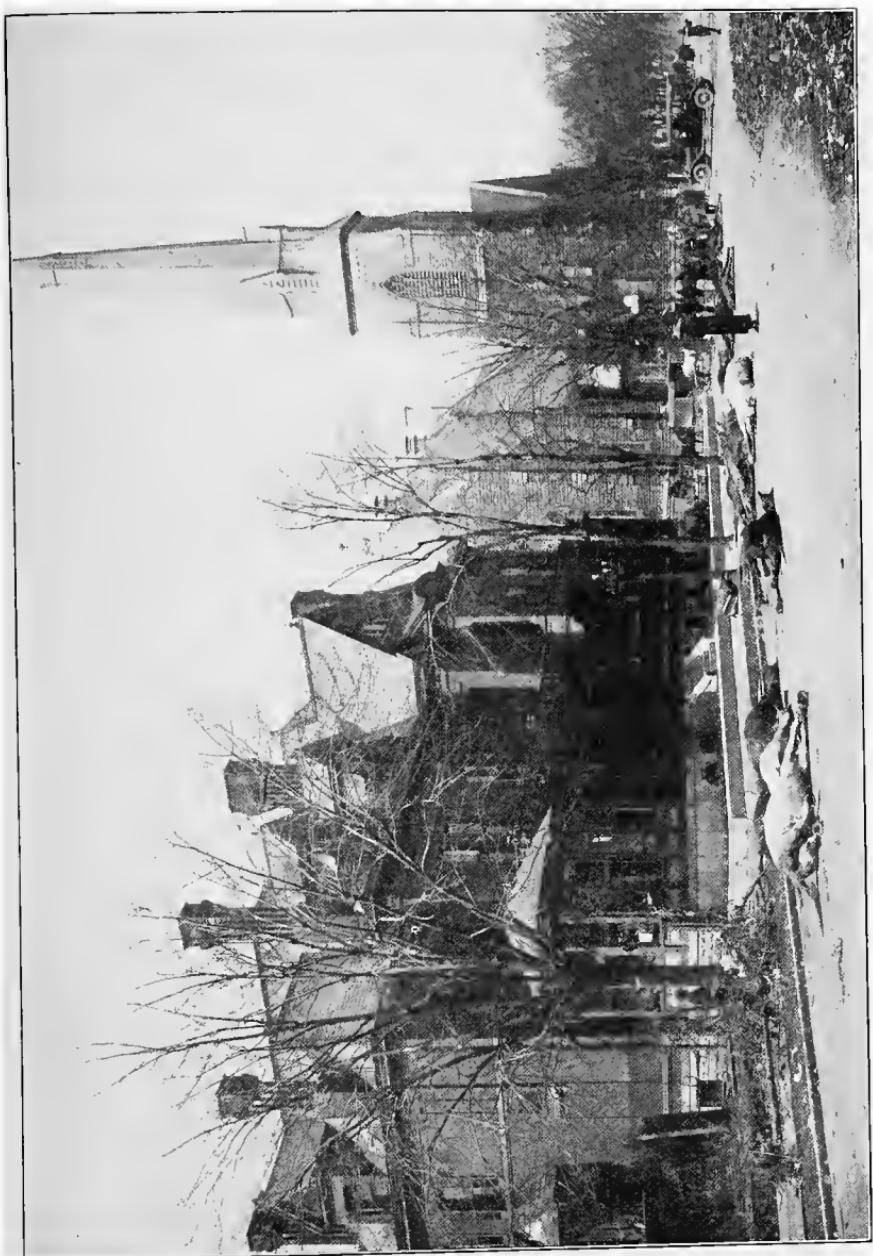


FIG. 28.—DEAD HORSES AT LUDLOW AND SECOND STREETS, DAYTON.
In Dayton the removal of 1420 carcasses of horses and mules was recorded in one official report. The Dayton Bicycle Club voluntarily assumed this disagreeable task.

The question of patrolling the streets and protecting property, the water having practically receded now from all parts of the city, became the most important one for determination, and the solution considered by me best for this problem was to establish a rigorous curfew. Therefore, on the afternoon of Saturday, March 29, notices were posted all over the city of Dayton directing that from 6:00 o'clock p. m. until 5:30 a. m. no one would be allowed on the streets of Dayton without a pass from a zone commander. It is to be said, to the credit of the citizens of Dayton, that this stringent regulation was received in the spirit in which it was ordered, and from the very first evening but little trouble was encountered in enforcing it.

To avoid interfering with the work of the various public utilities companies which were making every endeavor to repair their damaged plants and wiring, passes (public service, so called) were issued to their employees, good at all times and not needing reissue every day, but with the rest of the citizens a pass had to be issued good for a specific night.

On Sunday, March 30th, I had a consultation with yourself over the telephone on the question of the sanitary work. The Federal Government having very kindly placed Major Rhoads, Medical Corps, U. S. A., at our disposal, it was determined to place him in charge of the sanitary work, and make him a member of the staff of the Brigadier General commanding the Dayton Military District. It was understood, however, that all work was to be done under the authority of the State of Ohio, and that no encroachment on its work was to be made by the Federal Government, you believing that the State of Ohio had the strength to handle this herculean task, and that the people wanted the State to do it.

On the afternoon of Sunday, March 30th, I received orders from your headquarters in Columbus directing me to send Colonel Howard and the eight companies of the Sixth Ohio Infantry on duty in Dayton, the First Ambulance Company, and the Ship's Company of the U. S. S. Essex and Dorothea, to Cincinnati, to report to General McMaken. An order was issued at once to the various organization commanders, transportation was promptly secured, and all the organizations covered by the order left Dayton on Sunday afternoon.

Major D. A. Lynch was also relieved from duty and directed to proceed to Cincinnati, the vacancy on my staff caused by his removal being filled by the appointment of Captain C. W. Hosier as Chief Commissary Officer.

On March 30th, by General Order No. 13, the second and third military zones were consolidated, and Colonel H. G. Catrow placed in command of the consolidated district.

March 30th, being Sunday, the city was overrun by a horde of sightseers. It finally became necessary for me to issue orders closing the various roads leading into the central part of the city to try to avoid the crowd.

On Monday, March 31st, the work of the street cleaning was proceeding slowly, and I deemed it necessary to impress every able-bodied man found on the streets and put them to labor in the work of renovation. This order was enforced by details from the National Guard and the number of sightseers in Dayton diminished very materially. This labor, while forced, was paid for by the Citizens' Relief Committee at the regular rate established for all street labor.

In this connection I wish to commend the great labor of love performed by the Dayton Bicycle Club during these first terrible days.



FIG. 29.—BREAD LINE IN DAYTON AT THE FACTORY OF THE NATIONAL CASH REGISTER CO.

The loss in horses in the city from the flood was very great, nearly thirteen hundred horses and mules having been drowned, and their carcasses scattered all over the submerged portion of the city. The Dayton Bicycle Club very nobly volunteered to take care of this work, collect the carcasses and remove them to the fertilizing plant east of Dayton, and having put their hands to the plow, I wish to state, to their credit, that they performed this most disagreeable task in a business-like and prompt manner.

The question of subsisting nearly the entire population of Dayton on some kind of a relief basis was a most serious one, and was handled by the Citizens' Relief Committee with the assistance of the various zone commanders. Mr. Finfrock of the National Cash Register Co. took charge of the purchasing department, and Mr. Grant of the same institution managed the work of distribution.

I kept closely in touch with the situation and wherever necessary confiscated, under military authority, food supplies, etc., and turned them over to the Citizens' Relief Committee. The Federal Government forwarded to Dayton 300,000 rations which were of the greatest assistance.

The work done by Mr. Finfrock and Mr. Grant was performed in a most satisfactory manner.

The high water mark was reached by Tuesday, April 1st, when the books of the Citizens' Relief Committee showed 83,000 people were fed. From that time, however, the number gradually became less.

On Tuesday, April 1st, the machinery of the waterworks having been gone over carefully and placed in running condition, the water was again running through the city mains, but in limited quantities. A general order was issued from these headquarters directing that this water must be used for domestic purposes only and boiled before using, as the medical department reported it not fit for drinking purposes without boiling.

On the afternoon of April 1st, I visited Miamisburg and found the situation there very bad. The entire business section of the town had been torn to pieces, both railroads completely crippled, and all bridges gone from over the river.

The civil courts being crippled, and, as under the rule of martial law some kind of a court became necessary to take cognizance of offenses against martial law, a military commission was appointed by General Order No. 19 composed of the following:

Captain Karl I. Best, Third Ohio Infantry.

Captain Arthur S. Houts, Fifth Ohio Infantry.

Lieutenant Charles H. Milton, Fifth Ohio Infantry.

Captain Hubert J. Turney, Fifth Ohio Infantry, Judge Advocate.

The same officers were further detailed to sit as a Special Court for the trial of any military offenders.

By General Order No. 20, Captain Hubert J. Turney, Fifth Ohio Infantry, was detailed as Provost Marshal for the territory included in the Dayton-Military District, and the many serious questions involving salvage of property were placed in his hands. Unless a person saw with his own eyes the amount of property of all kinds scattered over the submerged district, it would be impossible to appreciate the immensity of the salvage question. As a conservative figure I would say that between \$150,000 and \$200,000 worth of property was salvaged under the direction of the Provost Marshal, and returned to the rightful owners.

Provost Marshal Turney was directed by me to organize a detective bureau for the greater security of life and property, the chief danger arising from the great number of men attracted to Dayton by the high price of labor during the reconstruction period. Many of these men were earnest workers, but others were from the flotsam and jetsam of the criminal classes of Chicago, from whence most of the number came.

He proceeded to Cleveland and obtained, by courtesy of Mayor Baker, of that city, the detail of Detectives John T. Shibley and James Moore, who rendered highly efficient services in the Provost Marshal's department throughout the tour of duty.

On the afternoon of Wednesday, April 2nd, you, accompanied by the State Flood Commission, Brigadier General John C. Speaks and staff, arrived in the city of Dayton, and were met by the General Commanding and taken to the National Cash Register Co., where an important conference was held covering the general situation in the Dayton Military District.

On the following morning the Governor and party were escorted all over the city of Dayton and given an opportunity to see the terrible work of destruction.

In the Enquirer of April 3, 1913, there appeared an article stating that seventeen men had been shot the night before under order of "Drumhead Court Martials," several of the executions being located on the steps of the Callahan Bank Building. The story was without the slightest foundation. I sent a personal wire to the managing editor of the Enquirer, which was published by them the next morning, denying the whole story. In this connection I would say that not a single person was shot and killed by any of the National Guardsmen, or by any one else, during the period of martial law in the city of Dayton, although there seemed to be quite a disposition on the part of enterprising newspaper correspondents to invent fictitious tales of drumhead courts martial. Drumhead courts martial are purely creatures of fiction and not known in American military law.

On April 3rd the city of Dayton suffered from very violent and heavy rains and the river rose rapidly, and, unfortunately, the town was filled with many sensational rumors as to breaking of reservoirs, etc. About midnight of April 3rd, being alarmed at the general situation, Colonel Talbott, Chief Engineer, and myself, made a tour of the levees in a driving rain storm, and found them safe, although the water in one or two places was very close to the top. In this connection I wish to add, to the credit of the Guard, that through the awful storm and rain of that night we found them alert in all parts of the city, and in several incidents on guard at the danger spots of the levee, this being a most unpleasant and trying kind of guard duty.

On the morning of April 4th you, having returned the previous evening from a visit of inspection at Hamilton, left with your party for Piqua.

The river continued rising on April 4th, but, fortunately, did not break through the levees. The breaks in them had been partially filled in by the Engineer Department, although it was impossible in the limited time since the flood to completely restore the levees.

On April 5th the rain ceased and the river began to fall, which was a most fortunate circumstance, as the nerves of the people of Dayton had been wrought upon for over a week to a terrible tension, and they could not stand much more strain.

FIG. 30.—PASSAGE WAY CLEARED THROUGH STREET OBSTRUCTED WITH DEBRIS.

This view shows East Monument Avenue, Dayton. Note the one-story building in middle of street, and the overturned barns on either side.



On Saturday, April 5th, Senator T. E. Burton visited the city of Dayton and was escorted over the entire city by Colonel Talbott and myself. Senator Burton's position in Congress, as expert on rivers and harbors, rendered his visit to Dayton a matter of great importance, and we desired to give him a full idea of the situation in the city.

On April 6th Senator Pomerene also visited the city and was in like manner escorted to the various parts thereof.

On April 5th Major H. H. Snively, Second Ambulance Company, O. N. G., and a greater portion of the Ambulance Company and Hospital Corps, O. N. G., were relieved from duty and returned to home station.

On April 4th Captain W. R. Hughes was relieved from the command of the Miamisburg district and Colonel E. S. Bryant, Second Ohio Infantry, was placed in command thereof, and on the same day General Order No. 23, on account of increased daylight, was issued, extending the hour of curfew one-half hour, making the time 6:30 p. m.

On April 6th General Orders No. 26, 27, and 28 were issued, reading as follows:

"Notice is hereby given that farmers and hucksters coming into the city for the purpose of selling and delivering food supplies will not be pressed into service. Such produce must not be sold above regular prices. Those charging exorbitant prices will be subject to arrest and confiscation."

"Notice. Salvage is the property, not of the finder, but of the lawful owner. Without passing upon the rights of persons saving and preserving salvage, for compensation by the owner thereof, notice is given that persons having in their possession the property of another, whether saved by them or brought upon their premises by the action of the elements, should seasonably report the fact to the owner, if known, or if the owner be unknown, to the Provost Marshal, or the Military Commander within the zone where the property is situated, or the Commander-in-Chief. Persons having saved property have not the right to convert it to their own possession or to sell it. It is neither proper nor safe to assume that the owner of damaged goods has elected to abandon them, nor to take them away, convert them, or sell them under such an assumption. The legal owner is the sole judge of their value and of the question as to whether he desires to regain possession of them, or to abandon them."

"No person, not a merchant of Dayton on the 25th day of March, 1913, may open a new retail store within the district governed by martial law during its continuance, without first obtaining a permit from this office. No expense will be attached to the issuance of such a permit and no fee charged; but no such a permit will be issued without the most searching investigation into the good faith and permanent character of the proposed new enterprise."

General Order No. 28 was issued because it came to the knowledge of the General Commanding, that certain fly-by-night merchants from Chicago had leased store rooms in Dayton, and intended to take advantage of the condition of the Dayton merchants. As a result of this order no such stores were opened, and only two applications made for new stores, both of which were refused.

MIAMI CONSERVANCY DISTRICT

On Monday, April 7th, the ten-day bank holiday ordered by you having expired, the banks in the city of Dayton opened for business, and, at their request, guards were placed in their banking houses who remained there during banking hours.

On Monday, April 7th, the situation in Dayton having materially improved, the following organizations were relieved from duty and directed to report to home stations:

Company A, 9th Infantry, Springfield.

Company C, 9th Infantry, Dayton.

Company A, Ohio Signal Corps, Toledo.

On April 8th, Colonel Vollrath and the companies of the Eighth Ohio Infantry, and Colonel Bryant and the companies of the Second Ohio Infantry, were relieved from duty and directed to report to home stations, Colonel Vollrath's command of the first military zone being assumed by Captain L. E. Smith, Third Ohio Infantry.

The citizens of Dayton were very much exercised over this withdrawal of troops and protested very vehemently on the subject, but I was of the opinion that sufficient troops were left in the city of Dayton to properly handle the situation, and the result showed that my opinion was correct.

By this time both the electric light and gas companies had re-established portions of their service, and parts of the city were again in normal condition as far as street lights were concerned, and this naturally reduced very materially the guard duty of the troops.

Colonel Bryant, having been relieved from command at Miamisburg, Lieutenant J. M. Fitzpatrick, Company K, Unattached Infantry, O. N. G., was placed in command.

On April 8th, after a conference with the police department of the city of Dayton, it was determined to begin the transfer of territory from the patrol of the National Guard back to the police department; and by General Order No. 34 and Special Order No. 12, Paragraph 11, all territory lying south of Mad River, and east and south of the general line of Dutoit Street to La-Belle, Richard, Wayne, Oak, Brown and Apple to the Miami River, was turned over to the police department, and they also were placed in charge of the traffic duty in the central part of the city. At the same time the territory covering Riverdale north of the flooded districts and Dayton View was turned over to the police department, as was the territory west of the submerged district in Miami City and Edgemont.

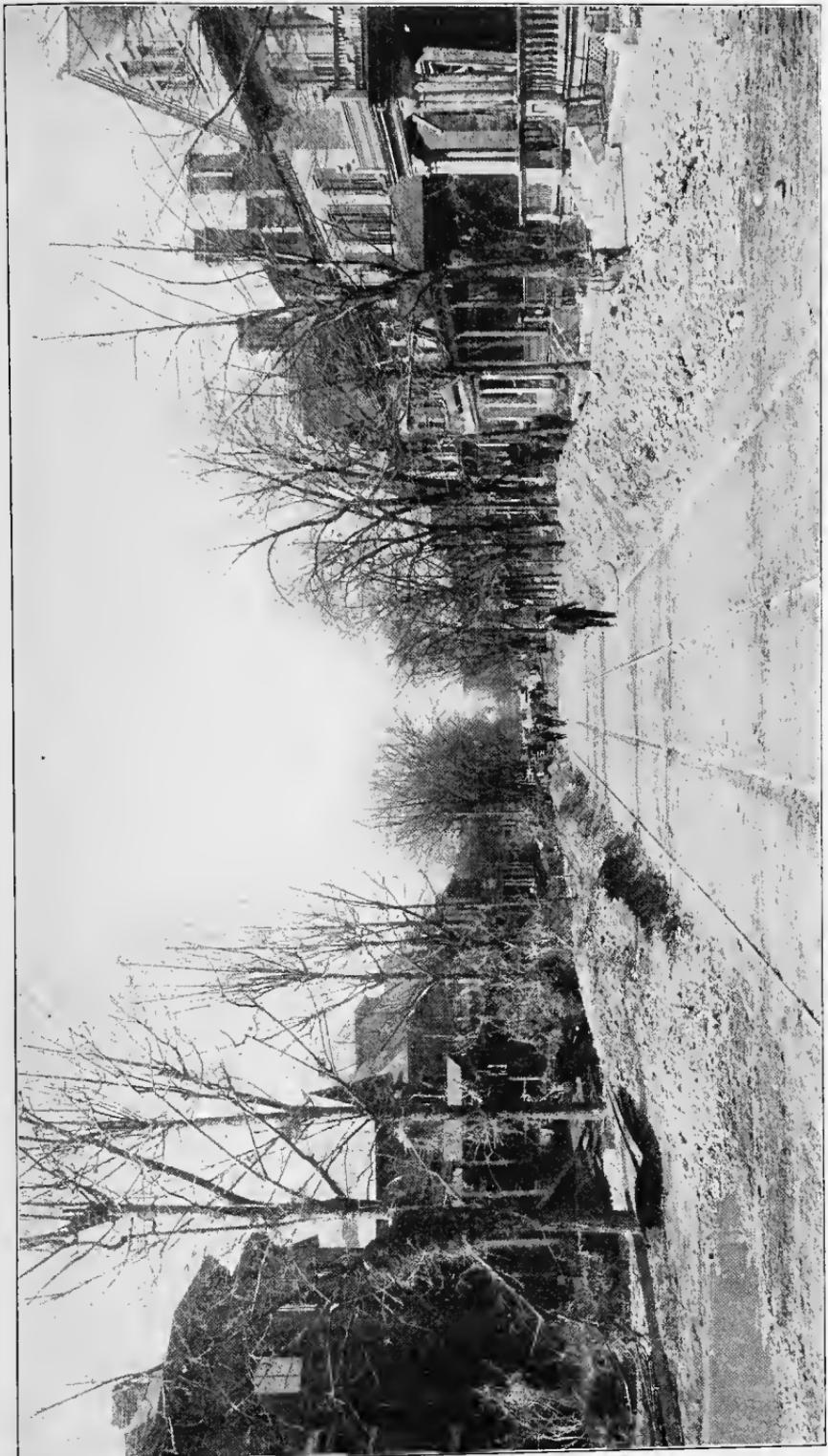
On Friday, April 11th, Major Allen and three companies of the Fourth Ohio Infantry, on duty in Dayton, and that portion of Company K, Unattached Infantry, still on duty in Dayton, were relieved from duty and ordered to report to their home stations. This was rendered more easy by the police assuming control of certain sections of the city as mentioned above.

On Friday, April 11th, natural gas also was turned into the mains of the city. This was a great assistance to the people of Dayton, who had difficulty for the preceding two weeks and a half in heating their houses and cooking food, a large proportion of them relying entirely upon natural gas.

During the first four days of the flood and before the arrival of any considerable portion of the Ohio National Guard, many citizens of Dayton volunteered their services and were sworn in as special deputies. To show a proper appreciation of their services and to free them from any possible

FIG. 31.—GRAVEL DEPOSITS ON SOME STREETS WERE SEVERAL FEET DEEP.

The work of cleaning streets progressed slowly. View of Monument Avenue, Dayton, after the tracks had been cleared.



further demands on their time, General Order No. 37 was issued April 12th, reading as follows:

"All obligations incumbent upon volunteer guards, special deputies, and citizen police sworn in as such, since March 25, 1913, are hereby released and all appointments as such are void.

"Special thanks and commendations are extended to all citizens who have so given their time without compensation for the public good in any such capacity for the meritorious services rendered in these regards."

On April 13th Lieutenant Fitzpatrick and the detachment of Company K, Unattached Infantry, were relieved from duty at Miamisburg, and Hon. W. A. Riter was appointed Provost Marshal.

During all of this time the work of cleaning the stores and houses of the city of Dayton was progressing at what seemed to most of the citizens a very slow rate; but when the amount of deposits from the water and the ruined buildings, pavements, and property of all kind scattered over the streets is considered, it is probable that wonderful progress was made in this work.

One of the greatest helps in the work was found in the use of flat cars run in on the city street railway lines, which handled the hauling away of the debris in much larger quantities and much more quickly than could have been done by wagons.

On Tuesday, April 15th, Lieutenant-Colonel John R. McQuigg and the Engineers Corps left for their home station and this district was turned over to Captain D. J. Hapner, Company F, Third Ohio Infantry.

On April 15th, it being apparent that it would be necessary to continue troops in the Dayton Military District for some time and, it not being the wish of the Brigadier-General Commanding to work any hardship on the enlisted men, Lieutenant Colonel A. W. Davis, Fifth Ohio Infantry, was directed to organize a provisional battalion of four companies from the Fifth Ohio Infantry and Colonel H. G. Catrow was directed to organize two provisional battalions from the Third Ohio Infantry of men willing to remain indefinitely on military duty in the city of Dayton, Companies A and C, Third Ohio Infantry, having reported for duty in Dayton after completion of tour of duty at Piqua.

On April 16th, General Order No. 40 was issued reading as follows:

"On account of the increasing length of the time of daylight the hour of curfew is changed to read from 7:00 p. m. to 4:30 a. m., amending General Order No. 5 and General Order No. 23."

On Thursday, April 17th, through the great courtesy of the Winters National Bank, City National Bank, Dayton National Bank, and the Dayton Savings and Trust Company, the Brigadier General Commanding borrowed \$65,000, the only security required being the deposit of the pay rolls, and paid off all troops in the city of Dayton up to the day of payment. In justice to the other banks of the city of Dayton, the General Commanding desires to say that the first four banks from whom this favor was asked granted it, rendering it unnecessary to go any further.

On Friday, April 18th, I relieved and ordered to home stations all the officers and men of the Fifth Ohio Infantry not included in the provisional battalions made up from this command, and the officers and men of the Third Ohio Infantry not included in the two provisional battalions, and

Battery A, Ohio Field Artillery, reducing the Dayton garrison to practically one regiment. On the same day I increased the territory covered by the police to all of that portion of the city of Dayton lying west and north of the river and south and east of the submerged district. This practically reduced the territory covered by the troops to a very limited space, being the business and that portion of the residence section of Dayton lying west of Main Street and south and east of the river. At the same time curfew was extended to 7:00 o'clock p. m. in the evening.

On April 21st, by your authority, General Order No. 42 was issued:

"By authority of the Governor of Ohio, the order issued March 27, 1913, directing that all saloons in the city of Dayton be closed, which was afterward extended by order of March 28, 1913, to cover all saloons in Montgomery County, is hereby modified as follows:

"All saloons in Montgomery County are hereby permitted to be open from the hours of 8:00 a. m. to 6:00 p. m. All saloons in Montgomery County must be closed on Sunday. No intoxicating liquors to be sold to be carried from the premises. No intoxicating liquors to be sold to an intoxicated person. The provisions of the Greenlund License Law are hereby made a part of this order and the violation of any provision of this law will be reported to the License Commission in addition to having their places closed."

This order went into effect April 22nd, and while there were two unfortunate disturbances and quite a number of citizens celebrated their month's drought by imbibing too freely, the day passed fairly peacefully.

On Wednesday, April 23rd, the Provisional Battalion of the Fifth Ohio Infantry were relieved from duty and directed to report to home station. On the same day I had a conference with the Citizens' Relief Committee and told them that there was no more necessity for martial law in the city of Dayton, and that the city ought to take care of its own police duty and civil government, to which the members of the Committee did not agree. I telephoned you, giving you my views and requesting that martial law be suspended and all troops remaining in the district be relieved and returned home, but you stated that as the Relief Committee had unanimously requested that martial law be continued you would grant their request for the present and relieve no more troops.

On April 24th, under orders from you, I proceeded to Hamilton to investigate the situation in that city. I met and discussed the situation with the Citizens' Committee, and found conditions there very similar to the conditions in Dayton. Martial law was not then needed in any sense of the word but, owing to the fact that the citizens seemed to have no confidence whatever in the civil government which had been replaced by the military arm, they insisted that martial law should continue. In fact, they seemed to be willing to have martial law continue until the general election in November, 1913.

On April 25th all territory in the city of Dayton, outside of that bounded by the river, canal and railroad, was turned over to the civil authorities. On the same day Companies B, D, and M, Third Ohio Infantry, were relieved from duty and directed to report to home station.

On April 25th Captain Turney was relieved as Provost Marshal, and his assistant, Second Lieutenant Mills Matthews, was appointed Provost Marshal in his place.

MIAMI CONSERVANCY DISTRICT

On Sunday, April 27th, you visited the city of Dayton and held a lengthy conference with the Citizens' Relief Committee, going into the question very thoroughly of the necessity for martial law in the Dayton Military District, returning to Columbus the same evening.

On April 28th, Companies C and L, Third Ohio Infantry, were relieved from duty, and the hour of curfew changed to read 11 o'clock p. m. to 4:30 a. m., and the hour of closing the saloons extended to 6:30 p. m.

On April 27th, by General Order No. 47, a board composed of Colonel H. G. Catrow, Captain Cyrus E. Mead, and Captain William V. Knoll, Third Ohio Infantry, was appointed to pass on and audit all claims or alleged claims against the State of Ohio, arising out of the service of the Ohio National Guard in the Dayton Military District from March 25th, 1913.

The services of this Board were afterward used by the American Red Cross and the Citizens' Relief Committee, and the Board became a general clearing house for all kinds and description of claims arising out of the flood situation in the city of Dayton.

On April 28th, Company A, Third Ohio Infantry, was relieved from duty and ordered to report to home station, and Major R. L. Hubler, Third Ohio Infantry, directed to form a Provisional Battalion of the three companies for duty in the Dayton Military District; the idea being to keep only those men whose services would not be a hardship on them or their employers.

On April 29th, under orders received through the Adjutant General's office, I proceeded to Washington, D. C., Colonel H. G. Catrow assuming command during my absence.

On May 2nd, I returned from Washington and again assumed command of the Dayton Military District.

On Saturday, May 3rd, I held a conference with the Citizens' Relief Committee and, after a great deal of patient argument, convinced them that martial law was no longer necessary in the city of Dayton, and they prepared and passed a resolution asking you to suspend martial law and relieve the troops from duty in the city of Dayton. This was communicated by me to yourself by telephone and you authorized me to take steps to relieve the troops in Dayton, Tuesday, May 6th, stating that a proclamation would be issued by you lifting martial law. This was done under your hand Monday, May 5th, and at 8 o'clock a. m. Tuesday, May 6th, by General Order No. 50, all officers and troops in the Dayton Military District were relieved from duty and directed to report to home stations.

At 8:00 o'clock on the morning of May 5th, I personally called on the Director of Public Safety of the city of Dayton, and notified him that I had relieved all guards and patrols from duty and that the city of Dayton was again fully in the charge of the civil authorities.

On relinquishing command of the Dayton Military District, I issued General Order No. 51, as follows:

1. "Martial law having been suspended in the County of Montgomery by the proclamation of Governor James M. Cox, at 8:00 a. m., Tuesday morning, May 6, 1913, and the County of Montgomery having been formally turned over by the Brigadier-General Commanding to the civil authorities, the Dayton Military District is hereby disbanded. The General Commanding desires to express his appreciation of the conduct of the officers and men of the Ohio National Guard, who served in the

Dayton Military District. The work during the first few weeks of this tour of duty was arduous and difficult. The city was in complete darkness, doors were open, windows were without glass, and property of all kinds was unprotected. In spite of all these facts, no authenticated case of looting by troops has been brought to these Headquarters.

2. "The Ohio National Guard has shown what training and discipline can do, and it is the hope of the General Commanding that they will in the future maintain their present high standing, and keep the confidence and good will of the citizens of the State."

The work done by the National Guard in the city of Dayton was of such a high character that the General Order quoted above is but a poor appreciation of their services. They came to a city crushed down, submerged, and dark, with the civil government gone. They started the work of re-creation and they did their work well. Both officers and men alike, under the most disagreeable and painful surroundings, were vigilant, watchful, and cheerful. I wish to especially comment upon the patrolling done by the enlisted men. On streets covered with debris, without a ray of light, on many nights in drenching rain storms, they marched their posts, and many citizens of Dayton have since then told me that the step of the Guards patrolling the streets was the sweetest lullaby they had ever heard.

It would be unjust to conclude this military report without alluding to the magnificent work done by the Citizens' Relief Committee, Colonel John H. Patterson, Chairman, Mayor E. T. Phillips, Colonel Frank T. Huffman, Adam Schantz and John R. Flotron. In connection with the Red Cross Society they had charge of all relief work and co-operated with Dr. Devine, local manager of the American Red Cross, in handling the vast bulk of business that passed through its hands.

The Relief Committee also most cordially supported all military measures taken by me, and by their personal acquiescence in obeying the law set an example to the other citizens of Dayton.

I also most heartily commend the untiring efforts of Mr. Mays Dodds, Director of Public Safety of the city of Dayton. From Tuesday morning, March 25, 1913, when the waters were descending upon our unhappy city, until May 6th, when I turned over the city to him, there was never the slightest friction between his department and the Military Government. We worked in perfect unison for the saving of life and property, the guarding of the city and the common benefit and good of all citizens.

Major Thomas L. Rhoads, U. S. A., whose services were kindly given to the State of Ohio by the War Department, performed the duties of Chief Sanitary Officer in a most satisfactory manner, and a deep debt of gratitude is due from the citizens of Dayton to Major Rhoads and the Secretary of War.

To the members of my staff, all of whom displayed great zeal and faithfulness in the performance of their duty, I desire to express my sincerest appreciation for the good work.

Colonel Vollrath, Colonel Zimmerman, Colonel Bryant, Colonel Howard, Colonel Catrow, and Lieutenant-Colonel McQuigg, during their service in the Dayton Military District, carried out most cordially all orders looking to the rehabilitation of the city of Dayton, and maintained in every way the high standard of the Ohio National Guard.



FIG. 32.—MANUFACTURING PLANTS SUFFERED HEAVILY.
The foundry of the Hooven Owens Rentschler Co. at Hamilton showing wrecked machinery mixed with debris washed in from outside. Note the motor boat in left center of view.

But I feel that my deepest debt of gratitude is to you for your hearty and consistent support in the arduous task which you placed on me. In the early days of the flood, when the problems were most vexatious and difficulties greatest, you were on duty at every hour of the day and night, and the very feeling that you were in hearty sympathy with the work done made our labors easier and our responsibilities lighter.

GEORGE H. WOOD,
Brigadier-General, Commanding Dayton
Military District.

Colonel Chas. X. Zimmerman was in charge of the National Guard at Hamilton, and his report cites briefly the conditions there immediately after the flood:

Cleveland, Ohio, May 1, 1913.

From: Commanding Officer, Fifth Infantry,
To: The Adjutant General of Ohio.

Subject: Report of Flood Relief Duty at Hamilton, Ohio.

Pursuant to telephonic orders from General John C. Speaks, Assistant Adjutant General, received at Dayton at 1:10 a. m., on the 29th day of March, 1913, and similar orders received from General George H. Wood at 5:30 a. m., same day, I left Dayton accompanied by Captain J. W. Pattison, Ordnance Department, for Hamilton at 6:00 a. m., traveling in Captain Pattison's automobile, arriving at Hamilton at 9:38 a. m. In making this trip we were obliged to take a circuitous route because many of the bridges had been swept away by the flood. We found Hamilton a terribly stricken city. All of the business district was or had been under water. No commissary supplies of any description could be obtained in the city as everything had been destroyed or carried away by the flood.

I met with a number of men who had formed themselves into a citizens' committee to look after the welfare of the stricken people. Every member of this committee made a verbal report of conditions existing in the district under his particular observation. I also secured information as to the working ability of the various city officials under existing conditions. The committee was informed that martial law would be in effect immediately and that I would assume charge of the affairs of the city appointing such assistants as would be deemed necessary. Headquarters were established in Room 208, Rentschler Building. Orders were issued appointing among others Mr. D. H. DeArmond, Director of Safety, Mr. J. H. Holzberger, Director of Service, and Dr. A. L. Smedley, Health Officer. These gentlemen held similar positions under the civil government. These officials, together with Mr. J. H. DeArmond, Chief of Police, and the gentlemen appointed as emergency efficiency supervisors, one for each ward in the city of Hamilton, were of great service to me and of still greater service to the city and its inhabitants.

The following troops were at Hamilton during my stay: Companies C, D, F, G, First Infantry; Company E, Third Infantry; Troop C, First Cavalry; First Field Hospital Company, Ohio National Guard, and a Field Hospital Company under the command of Captain Whaley and seventeen non-commissioned officers U. S. Army. All of the troops present for duty did most excellent work, the Hospital Company did valiant service, the city was

MIAMI CONSERVANCY DISTRICT

divided into fifty-six districts and a hospital man assigned to each district. Every house was visited daily. The inhabitants were furnished a copy of General Order No. 3, giving instructions for the prevention of disease, etc., and were given verbal instructions as to the requirements of this order.

Colonel Chas. F. Hake, Jr., of Cincinnati, was on duty in Hamilton previous to my taking command, and had the situation fairly well in hand before my arrival. Lieut. F. A. Finch, Engineers Corps, U. S. Army, was also on duty in Hamilton and volunteered to assist in every way possible. He supervised the work of incinerating the dead animals. Three hundred and nineteen horses, about the same number of dogs, cats, and other small animals, and about three thousand chickens and several tons of condemned meat were burned in the local ball grounds in the city limits.

As previously noted, it was impossible to secure commissary supplies in Hamilton. Great quantities of these supplies were donated by the citizens of Cincinnati and were sent to Hamilton in trucks. There being no water supply, orders were issued preventing the lighting of fires; the Red Cross Society of Cincinnati was requested to send only such eatables as could be eaten immediately after delivery. Bread, butter, boiled ham, canned meat, fish, apples, bananas, and other fruits were issued in the bread line. At first every citizen was obliged to take his stand in line as eatables could not be secured from other sources. Later the well-to-do made other arrangements. Coffee was furnished by the local committee under the direction of the military authorities, the coffee being cooked and served in fire-proof buildings only. After the coming of the Red Cross officials the management of this service was turned over to them.

The work of cleaning the streets was started with a vim. Every able-bodied citizen was obliged to do his share of work on the streets. Although considerably handicapped by lack of vehicles at the start, very good results were produced. Mr. Holzberger, Director of Public Service, assisted by Mr. Andrews, Street Commissioner, secured a number of trucks from outside the city and the work began to show results everywhere. Streets were made passable, sewers opened, water pipes repaired and water pumped into them. The Champion Coated Paper Company furnished the power and produced a water pressure of fifty-seven pounds or better by day or night.

The city of Hamilton is divided into six wards; all of the city excepting the First Ward is east of the river. As all of the bridges were destroyed by the flood it was deemed advisable to build a pontoon bridge to secure communication and to permit the inhabitants of the First Ward, who were caught by the flood and detained in the center of the city, to return to their homes. I took up this matter with the county commissioners and they agreed to build such a bridge. We secured the services of a recently discharged U. S. Engineer Sergeant, and the bridge was placed in position in about thirty hours, and did good service during my stay. I understand this bridge was carried away by the strong current occasioned by the rapid rise of the water, the day after I left Hamilton, and was never rebuilt. Before leaving Hamilton I arranged with the B. & O. S. W. Railroad's engineer to construct a foot bridge in connection with a railroad bridge he was to supervise the building of, and which was to be completed within eight days.

Great credit is due to all the city officials appointed as part of my staff for their energy and for the harmonious manner in which they carried on their work. At no time was there friction between the civil and the military.

officials. Greater still is the credit due every citizen of this grief-stricken city for the manner in which each individual went about to clean up the city, to restore sanitation, to live up to all the strict rules promulgated by the military authorities, and to assist in restoring the city, its business, its homes, and its public work to the point of efficiency and comfort in evidence before the disastrous flood became an unwelcome visitor.

Sunday, March 30th, Hon. L. M. Garrison, Secretary of War, General Leonard Wood, U. S. Army, and myself made a personal inspection of the city. Both Mr. Garrison and General Wood stated that the work that had been done and that was being done was to the best interests of the community, and Mr. Garrison expressed himself to the reporters present as follows:

"Colonel Zimmerman and the officers on duty with him have met and are prepared to meet the whole situation efficiently and completely. I see no reason why the work being done here should not be continued along the same lines, and I cannot conceive of any reason why the War Department or the government should interfere in any way."



FIG. 33.—SUBSTANTIAL PAVEMENTS WERE COMPLETELY DESTROYED.

On South B Street, Hamilton, not only the asphalt was removed, but even the concrete base was demolished.

We were considerably disturbed by the lack of fire protection. One fire engine company was secured from Cincinnati. A request for one thousand feet of hose was refused. For some reason the authorities at Cincinnati doubted the necessity for this request. Upon my personal solicitation, backed by that of Captain Pattison who is a personal friend of Mayor Hunt of Cincinnati, the Mayor, accompanied by his director of safety and chief of his salvage crew, paid a visit to Hamilton, and after making a thorough investigation of conditions agreed to and did send two thousand feet of fire hose.

MIAMI CONSERVANCY DISTRICT

I am unable to furnish a list of the dead for the reason that I left Hamilton on Friday, April 4th, turning over the command to Colonel L. W. Howard, Sixth Infantry, this list being incomplete at the time. This matter probably will be taken care of in his report.

During the tour of duty it was incumbent on me to act as court officer. Very few cases were brought to my attention, the citizens in general being most law-abiding.

The stern character of justice administered and the sentences imposed had a most wholesome effect in maintaining law and order and strict obedience to military order. The list of persons tried and sentenced will be found in my letter to Colonel Howard transferring my command.

The most serious case brought before me was that of _____ Humane Agent at Hamilton, and his companion_____. They were accused and plead guilty to breaking into a car and stealing hams that were intended for the hungry people of Hamilton. Both _____ and his son testified that they carried home three half-bushel baskets of hams which Mrs. _____ was salting down expecting to create a year's supply. _____ was carrying hams home in his arms. Some two hundred pounds had been so disposed of. _____ and _____ were sentenced to sixty days in the Cincinnati work-house, sentence being suspended during the time they remained beyond the city limits of Hamilton. They were drummed out of camp. The military had no drums with them, but _____, next door neighbor, volunteered to do the drumming. At noon every person stopped work and stood on the curb of the main street while _____ and _____, in charge of Troop C, were marching to the city limits. This sentence was in all of the papers in the United States, and although it may be considered severe it met with the approval of every Hamiltonian and did more to stop petit larceny than any other circumstance.

Attached hereto you will find copies of all general orders, special orders, memorandums and communications, together with a map of the city and a set of photographs. The orders, memorandums, communications and photographs will give you as clear an explanation of the work done in Hamilton as the most lengthy report.

Before closing I want to express my sincere appreciation of the work done by all of the officers and men who served with me during the tour of service. Especially Colonel C. F. Hake, Jr., Major F. W. Hendley, Captain A. M. Whaley, Lieutenant H. A. Finch and Captain John W. Pattison. These officers rendered magnificent service. They were full of resourcefulness and energy, and they assisted both the soldiers and the civilians in setting an example by their cheerful, thorough, and prompt obedience to order at all times.

Respectfully submitted by
CHAS. X. ZIMMERMAN,
Colonel Fifth Infantry.

If the flood had been confined to a single river system, such as the Miami, relief could have been secured immediately, and privations very much relieved; but almost the entire state was in distress. The report of Brigadier General Speaks of the Ohio National Guard gives an accurate general impression of conditions in Ohio

during and immediately after the flood, and indicates the extreme demoralization of the functions of government, communication, and transportation. The entire report, except for detailed commendation of the work of the Ohio National Guard, is reproduced:

October 15, 1913.

The Adjutant General, State of Ohio.

Sir:—Submitted herewith is a report of service performed under direction of the Governor in connection with the flood of March, 1913. In view of the large number of reports to be made by officers commanding districts, stations and detachments, covering the active operations of troops in the field, it is thought advisable to limit this statement to a general review of the subject, recounting broadly the mobilization, distribution of the troops, and the service performed as a whole. While perhaps not entirely necessary in a report of this character it would seem for record purposes not inappropriate to refer briefly to the exigency requiring the assistance of the Guard.

A continued and unprecedented rainfall covering an area whose topography was well designed to produce the results which followed, finally created a volume of water overshadowing all previous records, and setting at naught the calculations of the most farseeing official who might be giving such matters attention. Barriers which had proven sufficient in danger stages of the past were in this emergency useless, and in many instances only served to increase the destruction. Great watersheds and courses combined to make a resistless flood, swelling to proportions undreamed of, sweeping everything before it and finally submerging miles of territory which was thought absolutely beyond the danger line. It is estimated that no less than one-half million people were directly affected by inundation.

In loss of life and property, in suffering endured by helpless women and children, in tortures experienced by thousands who thought themselves safe, but with families and friends imperiled could only wait for the final story which should bring happiness or added sorrow, the entire state overshadowed with gloom and apprehension,—in all of these the flood of March may be remembered as Ohio's greatest calamity, and will be recorded as one of the catastrophes of modern times.

In its wake came the opportunity to witness that wonderfully impressive spectacle occurring at rare intervals, a great state, and even a nation in united, serious, and vigorous action.

Instantly with the first news of the disaster and intimation that assistance might be required, there came from the country's remotest limits messages of sympathy and assurance, tenders of aid and inquiries as to the manner in which a patriotic people could best give expression to their desire to lend substantial comfort. From the President to the humblest citizen; from the great commercial and financial institutions of the cities to the hastily formed relief committees of the smallest hamlet; from every form of organized society to countless individual activities; from North, South, East, and West came a cry of encouragement to the relief workers and of generous promise to the stricken.

The one great predominating lesson of the flood was found in that magnificent exemplification of patriotic comradeship and Christian sympathy permeating the hearts of the American people.

With characteristic energy and resourcefulness the entire personnel of the state, with the Governor leading, at once addressed itself to the all-absorbing problem of succoring their distressed neighbors and fellow citizens. Every available agency which could be of service in the inspiring work was freely at command of those directing operations. Railways promptly placed such of their lines as could be used at the public disposal, permitting freest use of equipment and traffic resources; telephone companies rendered marked service in improvising lines of communication to the stricken districts. At the same time these activities were in progress incessant rains continued, and the public mind was kept at a high pitch of excitement by wild reports of additional dangers impending by reason of breaking dams and reservoirs. While there was little occasion to fear further from this cause it seemed impossible to allay apprehension. Witnesses of the scenes in Columbus, for instance, following the apparently authentic report that the storage dam had given way will probably never forget the experience. Similar incidents occurred in other localities and much mental suffering resulted from these sources.

Reporting at the Governor's office at 9:30 o'clock p. m., March 25th, pursuant to instructions by phone, and being advised that in the absence of Adjutant General Wood, who was water-bound at Dayton, I should mobilize such portion of the Guard as might be required for service in sections affected by the flood, plans were at once made to that end. At this moment the full extent of the disaster was not realized, although it was known that certain sections were in a serious condition with many indications that a wide area would finally be involved. Developments soon revealed a situation impossible to anticipate and without parallel in the history of Ohio's misfortunes. There was no former experience to guide in this emergency and it thus became necessary to hurriedly formulate and adopt such measures and plans as, at the moment, seemed most likely to assure success in meeting each new condition as it arose. As the operations progressed you directed that General Wood should assume command of the troops reporting at Dayton, and remain in charge of that district. By your order also General McMaken was placed in charge of the northern portion of the state, but in view of the alarming conditions along the Ohio River he was ordered to Cincinnati with a proper force, including the Naval Brigade with boats, to organize and direct the relief measures it was anticipated would be required for that section, and to command the district south of Dayton and west of the Scioto River.

For the moment Dayton appeared to be the point most seriously affected and initial plans and movements were framed with that place as the objective. It soon developed, however, that other cities and towns scattered in all sections of the state were calling for assistance, but impaired lines of communication prevented their appeals reaching Columbus until a later hour. Soon Piqua, Sidney, Troy, Middletown, Hamilton, Miamisburg, Defiance, Napoleon, Ottawa, Fremont, Tiffin, Warren, Ravenna, Youngstown, Delaware, Columbus, Zanesville, McConnellsburg, Marietta, Pomeroy, Middleport, Gallipolis, Ironton, Portsmouth, Manchester, Chillicothe and many small places in the Miami, Scioto, Maumee, Sandusky, Ohio and Muskingum Valleys found themselves in need of help and were included in the relief operations. Even farming sections were seriously involved, the loss to these interests reaching an immense sum by reason of the fact that hundreds of

acres of land were ruined by having all soil swept away, while in other cases, rich, producing territory was transformed into immense gravel beds.

Lack of transportation facilities made it impossible for any regimental organization to concentrate at any point with its entire strength. Commanding officers with well laid plans for hasty mobilization, requiring but a few telegrams or telephone messages to insure prompt action including even railway transportation, found such arrangements almost useless on this occasion. In every instance some companies were unable to reach the general rendezvous, regimental organizations therefore being considerably disrupted. With such companies as were available every effort was made to quickly reach points to which they were ordered, instructions being left for remaining organizations to follow. Many of these were required for service at home stations while others, being the only troops available for meeting an emergency, were detached by orders from General Headquarters, without means to communicate the facts to regimental commanders. The disintegration of commands was regretted, but entirely unavoidable. In many instances it was most fortunate since it resulted in providing a reserve force for meeting demands wholly unexpected.

It would be difficult to conceive more unfavorable conditions for mobilizing hurriedly, and the whole situation presented a condition well calculated to test the capabilities and efficiency of the National Guard for emergency purposes. It might be added that the troubles were not lightened when each call for help was coupled with the imperative admonition that troops and haste were absolutely necessary. Telephone and telegraph lines were greatly impaired, in many instances large areas being wholly without means of communication, making the transmission of orders and information extremely difficult or impossible. Railway and traction systems most needed were completely demoralized. Lines running to districts appealing for soldiers, food, and clothing, were helpless in many instances, bridges and miles of trackage having entirely disappeared. The great agencies so essential to modern activities, and which the country has learned to rely upon, seemed prostrate.

Orders directed commanding officers to assemble their organizations with the information that the Miami Valley would probably be the objective. They were advised to get in touch with railway officials and make any transportation arrangements possible. They were informed that there was no train service out of Columbus and no roads, either steam or traction, reaching Dayton. Large quantities of extra commissary supplies were ordered taken so that all detachments might be prepared to furnish relief wherever their operations extended. Many telegraphic orders relating to mobilization reached commanding officers 24 hours after being filed. In the meantime, however, every conceivable method was employed to insure information reaching them. Telephone and telegraph relays; automobiles, horsemen; foot messengers; in instances a farm house could be reached and obligingly turned out a courier to arouse an officer in a nearby town, and he in turn took steps to have the order still further advanced. In other cases, telephone or railway telegraph operators, who alone could be reached, closed their offices while arousing any officer or enlisted man to whom the information could be conveyed. In the meantime, railway superintendents and general managers were called into conference, and after receiving reports and information from every source it was found impossible to reach

FIG. 34.—DEBRIS FROM LUMBER YARD AND WRECKED COTTAGES, TAYLOR STREET, DAYTON.



any point south of Columbus in either the Miami, Scioto, or Muskingum valleys. Communication was finally established with Cincinnati, which fortunately could reach Hamilton and Middletown by automobile. Later Springfield and Xenia, with intervening towns, succeeded in reaching Dayton via the Pennsylvania, followed by Washington Court House which found a connection through the C. H. & D.

In the meantime, from all sections of the state information was constantly reaching Headquarters, telling the story of destruction and suffering, with always a request for soldiers. While communication was difficult, from out of the wreckage there was always one hope that important messages could be received and transmitted. Tom Green, wire chief of the Bell exchange at Columbus, realizing the importance of the work in hand, volunteered his services, and placed at the state's disposal every facility his company afforded. With power to instantly seize any working wire, and assisted by a corps of expert operators stationed at advantageous places, and thoroughly conversant with the entire system, there was usually a possibility that some connection could be made with the most important points. From Columbus to Delaware, via Indianapolis or Chicago, for instance, or from Headquarters to Pittsburgh, connecting with telegraph to Parkersburg, thence by private wire to a point near Marietta, from which messengers transmitted information to that city. While individual commendation seems unnecessary where heroism was so commonly displayed, the important part performed by this man and his comrade, —— Bell, entitle them to the distinction and medals conferred upon them by the General Assembly.

At the darkest hour on the first night, while Dayton was entirely lost to the world, there came a call from the heart of the submerged city. —— Bell, wire chief of the Dayton exchange, was finally forced to the upper stories, where he succeeded in connecting with the only remaining trunk line leading out of the city. Unable to communicate with any person in Dayton he could only observe from the windows and by occasional trips to the roof and thus keep the world advised as to what was occurring within his range of vision. The tragic story in its successive stages told by this man while remaining at the post of duty presented a fitting theme for the dramatist's pen.

By 10:00 o'clock on the morning of the 26th, regimental organizations had made a creditable mobilization and were waiting transportation. In many instances, however, companies remained on duty at home stations, being ordered into service by local authorities, joining their commands at a later date for the more extended service. Columbus organizations were called by the Mayor at noon of the 25th, and remained on duty in that city, martial law being proclaimed and a separate military district established by orders of the Governor. The 7th, with the exception of five companies, was marooned at home stations and fortunately so, since their services were sorely needed at those points. Portions of the 2nd and 8th Regiments finally reached Troy, from which point south railroad facilities were entirely suspended. From thence to Dayton their progress was by marches, the country-side supplying wagons for transporting commissary and other stores. Snow and rain added to their difficulties. Communication was maintained with this column, their operations resembling a miniature military campaign. The 6th Infantry, with auxiliary troops from Toledo, after using boats to transfer men and supplies across a swollen stream and with a short

march finally found an entrance to Dayton; the 5th Engineer Battalion and Naval detachment of Cleveland, by a circuitous route, also reaching that point. The unattached companies of the late 1st Infantry reached Hamilton, Middletown, and other points in the lower valley by automobile and marches. The 3rd was almost entirely on duty at the respective home stations, the outlying companies later reporting at Dayton for the extended service. At the same time an expedition, comprising companies of the 8th, 2nd, and 3rd, for the relief of Zanesville and the Muskingum Valley, finally secured railroad transportation to point within a few miles of that city, from whence by boats, carried as a part of their equipment, troops and supplies were forwarded. Signal Corps detachments accompanying these operations established lines of communication with the various stations, using their own equipment for this purpose.

The service covered widest range in character and importance. Generally speaking, machinery of civil government was demoralized, the ordinary safeguards designed to insure safety to life and property being unable to meet the greatly increased responsibilities confronting them. Lighting, water, sewage, and transportation systems were wiped out, or wholly useless, for the time leaving cities in darkness, without means of communication, and deprived of every convenience. Food and other supplies were destroyed, and the people wholly employed with the primal questions of something to eat, a place for shelter, and personal safety. Millions in public property, banks, stocks of merchandise, and private belongings were at the mercy of looters. In a number of instances the civil authorities failed entirely, thus adding confusion to the deplorable conditions. It can readily be understood why the call for troops was constant and imperative. With their arrival followed order, safety to life and property, the machinery of government was reestablished, and the work of rehabilitation set on foot. In some cases martial law was proclaimed and welcomed by the citizens as the only method of relieving the chaotic conditions. It thus became a matter of the military authorities taking complete control in directing the work of reconstruction, in enforcing the laws of health and providing for the distribution of relief supplies. This form of government seemed so well suited to existing conditions that in every instance suggestions from headquarters looking to its being revoked resulted in a prompt protest from the places affected. This, in spite of the fact that in some cases it became necessary to establish curfew hours and regulate the periods when lights and fires might be used for ordinary household purposes. With one or two exceptions it is probable that in times of peace this country never experienced an occasion requiring such drastic measures as were necessary during these operations.

Immediately following your announcement of the conditions existing in Ohio, came a flood of messages from every section advising that money and relief supplies of every character were being forwarded. A special depot for quartermaster and other stores was established at Columbus, with branches at advantageous points, Colonel Edward T. Miller being in charge of the whole. The commissary depot was under direction of Majors Arthur W. Reynolds and David S. Lynch, while Colonel Mac Lee Wilson, by your direction, was designated as custodian of the financial contributions. The report of these officers indicate the tremendous volume of business transacted by the several departments. Dayton being most prominently men-

tioned in early reports of the disaster, hundreds of car loads and broken shipments were started consigned to that city, with no possibility of delivery. It became necessary to intercept and re-route many of these in order to make intelligent and equitable distribution of the supplies. Railway officials generally rendered valuable assistance in this work. These operations were carried on with such energy and system that after the first 48 hours there was no occasion for any persons being without food and clothing.

A sanitary force, including the entire strength of the hospital and sanitary troops of the state, reinforced by many local health boards and officers, all under the direction of Colonel Joseph A. Hall, performed most efficient service throughout the various districts in the work of sanitation, general cleaning up, and taking such precautions as were necessary to prevent the dangers from sickness and pestilence, which it was feared would follow the disaster.

The entire tour of service was exacting, laborious, and performed under the most trying circumstances—the weather being extremely disagreeable during a greater part of the time. In addition to ordinary military duties officers and men were called upon to perform every conceivable form of service entering into the conduct of municipal government, including the work of rehabilitation. In every instance the operations were carried on in such manner as to merit highest praise from the people they were serving. Fortunately, the Guard embraces in its personnel men from every profession, vocation, and trade entering into the activities of every day routine. This fact, coupled with the advantages of organization and military training, made them especially serviceable in the crisis, and they at once became a dominating factor in restoring confidence and hastening the return to normal conditions. The same statement applies to the many retired and ex-officers and men living in affected districts. Many of these communicated with general headquarters at the earliest possible moment, and as a result of their training and experience in the Guard were able to render most efficient service.

Without intention in the slightest degree to say anything which might be construed as criticism, brief reference is made to certain conditions existing in connection with the military department when the call for troops was found necessary. The General Assembly was in session, and for some two months previous to the flood a joint committee from that body was making an investigation of certain individual incidents and departmental methods. While not involving the entire organization, and although nothing indicating moral turpitude was developed, there were perhaps certain matters justifying criticism. These were given widest publicity and frequently presented in such manner as to leave the public with erroneous impressions as to conditions actually existing. The committee had not reported, but sufficient had occurred to affect the esprit de corps, and there was a general feeling among officers and men that a stigma had been placed upon the entire National Guard. In view of this condition and considering the magnitude of the disaster, fears were entertained in certain circles that the state forces might not be equal to the emergency and that the occasion demanded federal troops, later developments indicating that some steps had been taken to that end. It was quickly demonstrated that such course was unnecessary, however, and prompt decision of the Commander-in-Chief to place his

MIAMI CONSERVANCY DISTRICT

reliance in the National Guard saved the organization from humiliation and irreparable injury. The zealous and efficient service rendered justified his confidence, and it was a source of very great satisfaction to officers and men when, after arriving in the state and visiting important points, the Secretary of War and Commanding General of the Army publicly announced that no troops could have met the crisis in a more capable manner. It is pleasing to add that the prestige of the Guard was preserved, and that at the completion of the tour of duty the General Assembly unanimously passed a joint resolution directing that in recognition of the services rendered by the National Guard in connection with the flood, the Adjutant General prepare and issue to each officer and man a "Campaign Ribbon" "similar in size to that issued by the War Department to soldiers of the United States Army."

* * * * *

In conclusion, I make acknowledgment of the uniform courtesy and spirit of helpfulness accorded General Headquarters by every officer and man associated with the flood service. These operations were doubtless the most extensive and important which the Ohio National Guard has been called upon to perform. Their preparedness and ability to accomplish the difficult problems presented in this great emergency were a revelation and source of gratification to citizens generally. Their deportment was beyond criticism, while the intelligent and zealous manner in which their duties were executed justly entitles them to recognition as a most important branch of the state government and a safe reliance in times of danger.

* * * * *

JOHN C. SPEAKS,
Brigadier General, Ohio National Guard.

Knowing that disease commonly follows such a disaster health authorities including those of the local, state, and national governments immediately took precautions to maintain the health of the communities in the Miami Valley.

On March 26, Dr. R. H. Grube, a member of the State Board of Health, established headquarters at the National Cash Register Company plant in Dayton and acted in an advisory capacity. On March 29 the State Board divided the city into eight sanitary districts with a doctor in charge of each, with authority to appoint assistants. Emergency hospitals and central supply stations for the distribution of medical supplies were provided. Two quarantine stations were established to take care of infectious diseases. On March 30, Major Thomas L. Rhoads of the Medical Corps of the U. S. Army, was placed in charge of the work, with the title of Chief Sanitary Officer, and divided the city into sixteen sanitary districts.

The work done included the hauling away of debris, distributing rations, cleaning and disinfecting houses and premises, removing dead animals, cleaning catch basins and vaults, and distributing medical supplies and disinfectants. The work of the sanitary department continued till April 25. The following list, abstracted from the report of Major Rhoads to the Secretary of War, indicates the extent of this work during the month following the flood:



FIG. 35.—FLOOD WRECKAGE PILED ON ROOFS OF HOUSES.
It took stout hearts to undertake the task of restoring things to their former places. These homes on Bank Street, Dayton, had been completely submerged.

WORK OF SANITARY DEPARTMENT, DAYTON, OHIO, MARCH 29
TO APRIL 25, 1913.

133,600 wagon loads of debris hauled away.

580,000 Government rations distributed.

12,131 houses, cellars and premises cleaned and disinfected.

1,860 houses, cellars and premises cleaned and disinfected by property owners under supervision of Sanitary Department.

98 dead bodies recovered and embalmed.

1,420 dead horses removed.

2,000 other dead animals removed.

4,177 privy vaults disinfected in flooded district.

84,325 house inspections made.

60,000 sanitary notices distributed.

2,100 emergency cases given medical aid.

58 car loads of disinfectants used.

2,200 catch basins cleaned.

102 comfort stations erected.

On March 29, a representative of the State Board of Health arrived at Hamilton. Relief work at first was not organized, medical men from U. S. Army and Navy, and from the State Board of Health were on the ground but working independently. The State Board of Health then took charge of the work of sanitation. The city was divided into districts, regulations and instructions were posted, and supplies were distributed.

The American Red Cross Society during 6 weeks after the flood performed extensive service, sending nurses and financial aid, and after turning its work over to the Associated Charities, kept a representative on the ground for a longer period.

The smaller cities were visited by members of the State Board of Health who inspected conditions, issued instructions and assisted in relief work. A detailed account of the work of the State Board is given in the Monthly Bulletin of the Board for May, 1913.

Before relief work became organized a great many independent and unrelated efforts were made to alleviate conditions, but within a few days these were coordinated, especially in the larger cities and villages. Law and order was maintained by the National Guard, sanitation was in charge of the State Board of Health, and relief measures were under direction of the National Red Cross Association. In nearly all cases a large part of the actual work and much of the supervision was performed by local citizens. Thus, in Dayton the Citizens Relief Commission bore the brunt of the work, the Bicycle Club was responsible for the removal of dead animals, the telephone employees gave heroic service in keeping and re-establishing communications, the National Cash Register Company did wonders in relief work, local bakers used their entire facilities for supplying food, and farmers in the adjoining country brought in large quantities of provisions. Governor Cox was largely instrumental in coordinating the relief agencies throughout the State.

Gradually the cities took over the functions of government and of relief until by the middle of summer there were very few evi-

dences of management by external agencies. The American Red Cross, the last of the public relief agencies to remain in the field, closed its work during the following winter.

THE STATE RESERVOIRS DURING THE FLOOD

During and after the flood there were numerous reports that the Lewistown and Loramie reservoirs had broken and had contributed to or caused the flood. A socialist paper in Dayton insisted vehemently that the flood was caused by the manipulation of the reservoir gates by certain members of the capitalist class who desired a flood in order to bring about certain political changes. While as a matter of fact the very slight effect of these reservoirs tended to reduce rather than increase the flood, many persons not informed of the actual conditions, still believe seriously that the reservoirs failed or at least were largely to blame.

In order to have a definite record of conditions, two examinations were made of the reservoirs, the first in June, 1913, and the second in November of the same year. Later, detailed topographic surveys were made of both locations.

The Lewistown Reservoir, built in 1851-60 at a cost of \$600,000 for the purpose of storing enough water to insure an abundant supply for the southern part of the Miami & Erie Canal, is situated in Stokes, Washington, and Richland Townships, Logan County, Ohio. It has a drainage area of about 127.4 square miles, a water area of about 10 square miles, an extreme depth of 15 feet, and a designed capacity of 45,900 acre feet. It contains many islands and a large area of shallow water, with a heavy growth of rushes. The reservoir occupies a wide, shallow depression, the water being confined in parts by means of earth levees with 12 foot tops, and from 1 to 18 feet in height. In the immediate vicinity of the waste weir and waste gates the bank was protected by a concrete wall, but otherwise where protection was attempted it consisted of piling and timber revetment in very bad repair, and was entirely inadequate to protect the banks from wave action when the water was high in the reservoir. The land to the south and west of the reservoir is very low and is under water each spring.

A three days' visit was made to the Lewistown reservoir on June 26, 27, and 28, 1913, precautions being taken that the persons interviewed should not know that an investigation was being made. There seems to be no question as to what occurred during the flood of March, 1913, the eye witnesses agreeing on all essential points, and the evidence still on the ground bearing out their statements. The heavy rainfall of the last of March raised the level of the water in the reservoir about 40 inches above normal, or within from 9 to 14 inches of the average top of the embankments. Just before the storm began the water was about 14 inches below the spillway crest. At the maximum stage it was about 3 feet deep over the spillway crest, representing storage about 4 feet deep over an area of about 10 square miles. The total volume of water above the dam of such a stage would be about 25,000 acre feet.

The descriptions given by residents indicate that the high water below the reservoir was caused largely by the extreme flood conditions in the small creeks entering below the reservoir. These creeks backed the water up to the downstream side of the earth dam to such a height that the water below the dam was only about 5 feet lower than the highest water above the dam. One man claims that the flow of water from the small creeks into the flat land below the basins created a strong current upstream in the river and that he rowed several miles downstream against a strong current and then drifted back with the current to the reservoir. The large area of flat land below the reservoir filled up and became practically a lake several miles wide. The water in the reservoir



FIG. 36.—DOWNSTREAM VIEW OF OUTLETS OF LEWISTOWN RESERVOIR.

The opening of the gates of this reservoir which is situated on the headwaters of the Miami River, was supposed by many people to be the cause of the flood. The gate openings measure 4 feet by 5 feet.

did not quite overtop the embankment near the spillway, but did overflow at the following points:

1. At the waste weir situated at the most southerly point of the reservoir. This consists of a concrete wall 700 feet long. From marks given by Lou Fisher, hotel keeper at the bulkhead, the depth of water was about 38 inches over the weir.

2. At the waste weir gates, which are situated about 1000 feet west of the waste weir, consisting of two gates 4 feet wide and 5 feet high. The downstream ends of the gate openings are shown in figure 36. The gates are set in a concrete bulkhead, are operated from above by means of a wheel and worm gears, and have a V-shaped piling protection to keep out accumulations of drift.

These gates were wide open during the flood, but their discharge was insignificant when compared to the flow over the wastewater.

3. At a place, a distance north of Lakeview, where the bank is from two to four feet in height. Here the water flowed out of the reservoir with a depth of from 6 to 8 inches for a distance of about 700 feet, but due to the high water on the outside at this place, the velocity was so low that no damage was done.

The embankments were endangered by the action of waves at a point in the N. E. $\frac{1}{4}$ Sec. 35, T 6 S., R 8 E., and in the N. E. $\frac{1}{4}$ Sec. 1, T 7 S., R 8 E. In these cases the embankment was cut about one-third through and was only saved by the use of sacked gravel, but in none of these cases was any water discharged from the reservoir.

Since the flood the State Board of Public Works has strengthened the dam to some extent.

The Loramie Reservoir, situated in McLean and Van Buren Townships in Shelby County, occupies a shallow basin in the original valley of Loramie Creek, made into a reservoir by throwing across the valley an embankment about $1\frac{1}{2}$ miles long, and from a few inches to 20 feet high. It was built about 1840 to act as a feeder to the summit level of the Miami & Erie Canal. It has a drainage area of 81 square miles, a water surface area of 2000 acres, a maximum depth of 20 feet, and a capacity of 16,000 acre feet. A large part of the water area is very shallow, the stumps of the original forest showing above the water at ordinary stages. There are also many acres of reeds and bulrushes. A two days' visit was made to the reservoir on July 17 and 18, 1913, when careful examination was made of the embankments, waste gates, and waste weir, and eyewitnesses of the high water of March, 1913, were consulted in regard to conditions at that time. A second and more detailed examination was made in November of the same year.

The heavy rainfall of March raised the level of the water in the reservoir to a height of about four feet above the crest of the waste weir, or practically to the top of the low bank between the Anna turnpike and the waste weir. A few small openings were made in this part of the embankment, but about the only washouts of appreciable size occurred just above and just below the spillway, these being about a hundred feet long and about four feet deep. The water also flowed around the north end of the embankment in a stream 300 feet wide and of an average depth of one foot. The high embankment from the waste weir north was not overflowed, although the water reached practically to its top, and the use of sacked earth was necessary at some points to prevent overflow. The creek valley just below the embankment is about two miles wide, but farther down it is less than a quarter of a mile wide. This narrow gorge in the valley, by preventing the water from freely flowing downstream, was a factor in creating a lake of about 5000 acres just below the reservoir. The water overflowed first at the south end at midnight March 24, and reached its maximum depth by eight o'clock the next morning. The two breaks in the embankment were repaired during the flood with timber and sacked earth.

The water level below the embankment was about ten feet lower than above it. Water was discharged from the reservoir during the flood in addition to the above at the waste weir situated where the line between Sections 11 and 12 cuts the bank of the reservoir. This consists of a weir, shown in figure 37, 240 feet long, with ten buttresses 2 feet wide, extending 42 inches above the crest, and with a 6-inch concrete slab on top, dividing the weir into eleven openings 20 feet long by 42 inches high. There are two 4 by 5-foot gates operated from above by a wheel and worm gear, situated about 10 feet below the weir crest, one in panel 5 and one in panel 6 counting from the north end. There was a head of about 4 feet



FIG. 37.—DOWNSTREAM VIEW OF SPILLWAY OF LORAMIE RESERVOIR.

The gates are 5 feet wide by 4 feet high. A political paper in Dayton announced that the flood was caused by members of the capitalist class who opened these gates and turned the flood waters loose upon the valley.

on the weir on Tuesday morning, March 25, 1913, and the water at the weir was within 2 inches of the top of the slab, thus making the openings act as orifices rather than weirs. The waste gates are kept open except when the water is below the crest of the weir, being open generally during the winter and spring, and were of course open at this time. There is a single 4 by 5-foot gate situated about half way between the waste weir and the bulkhead, the top of the opening being about 5 feet below the elevation of the crest of the waste weir, operated in the same manner as the gates mentioned above. A 3-foot circular opening, which furnishes the supply of water to the Miami and Erie Canal feeder, was open during the flood. The waste weir discharges into a channel cut in high ground,

which parallels the embankment to within a few hundred feet of the bulkhead, and then turns to the west emptying into Loramie Creek.

It is evident that the reservoirs did not increase the flood stages, even in their immediate vicinity below the dams. Even if they had broken simultaneously at the most inopportune time, the difference in the stage of water should have been slight as far up river as Piqua. At Dayton the difference in stage would have been too small to be observed.

The following extracts from a report to Congress by a board of seven army engineers, headed by Col. Lansing H. Beach, and printed in House Document No. 1792 of the 64th Congress, pages 122 and 123, indicates the opinion of that board on the effect of these two reservoirs in reducing the flow of the 1913 flood:

* * * * On March 27 the water in the [Lewistown] reservoir was at an elevation $2\frac{1}{2}$ feet above spillway elevation. This accounts for 15,000 acre-feet of water. The total water detained by the reservoir was therefore at least 24,000 acre-feet, or half of the entire rainfall. Flood run-off measurements indicate that the maximum rate of run-off from the reservoir area was not over half that of other nearby areas of similar size and rainfall. When this fact is coupled with the fact that the maximum flow from the reservoir was not reached until the reservoir had been filled to $2\frac{1}{2}$ feet on spillways, and that by this time the crest of the unrestrained flood below had passed, it can be appreciated how great a regulating effect even this small reservoir had.

* * * * Up to 6:30 p. m., March 25 (about $3\frac{1}{2}$ hours after the crest of the upper Miami reached Dayton), the rainfall on this area amounted to about 7.5 inches, or 32,400 acre-feet. The water detained [in the Loramie Reservoir], therefore, at the time of the crest in the valley below the dam was nearly one-third of the entire rainfall up to that time. As in the case of the Lewistown Reservoir, it may be said that this reservoir is of considerable value as a flood regulator not only for the town of Loramie but for the valleys below.

THE EFFECTS OF THE 1913 FLOOD

In the building of cities, railroads, bridges, and canals, and in locating improvements near rivers, the usual high water stages are taken into account. It is generally assumed that past floods are a reliable criterion of what may happen in the future. That this course of reasoning has limitations in a new country with short records was tragically illustrated in 1913. Throughout Ohio and Indiana improvements and developments so planned as to be safe in case of ordinary high water were overwhelmed, and nowhere so completely as in the Miami Valley.

The loss of life is not definitely known. About 360 bodies were recovered. Hundreds of persons disappeared, never to be heard from again, in some cases the bodies probably being carried to the Ohio River or buried in the shifting sandbars of the Miami. The

long days and nights of terror spent in tree tops or on roofs in the rain that sometimes froze into sleet, in many cases caused mental collapse. Thirty-two persons were committed to the Dayton Hospital for the insane, their commitment papers expressly stating that their mental disability was the result of flood experiences. The commitments to this institution from Montgomery County in 1913 were more than double the number for 1912.

Many deaths resulted during the following months as a result of the extreme exposure, and in other cases health was permanently broken. At this date, four years after the flood, many people live



FIG. 38.—AN AISLE IN THE DAYTON PUBLIC LIBRARY AFTER THE FLOOD.

Mud and water destroyed 46,010 volumes and damaged many more. The losses sustained were conservatively estimated at \$85,000.

in the extreme fear whenever a rise occurs in the river. During a recent moderate rise in the river every available dray in Dayton was in use carrying household furniture to high ground. At such times many persons carry stores of food, water, and fuel to the attics, to be prepared for another inundation.

No accurate estimate could be made of the destruction of property. The following is believed to be the best data available as to loss of life:



FIG. 39.—TONS OF MUD WERE SHOVELED OUT OF THE HOUSES.

Everything that the water had touched seemed impregnated with a sticky, slimy ooze, which ruined furniture, wall paper, and plastering, and corroded machinery.



FIG. 40.—ASPHALT PAVEMENT DESTROYED BY FLOOD ON LUDLOW STREET, DAYTON. The swift current peeled off large areas of asphalt. The repairing of miles of streets became one of the costly items in the work of reconstruction after the flood.

SUMMARY OF FLOOD LOSSES IN MIAMI VALLEY

Drowned

Piqua	49
Troy	16
Dayton and Harrison Townships.....	73
Clark County	1
Franklin	7
Lemon Township, Butler County.....	3
Hamilton	106
	255

Other Loss of Life

Troy	3
Dayton and Harrison Townships	50
Hamilton	53
	106
Drowned	255
Other Loss of Life.....	106
Total	361

The above is the total of known deaths, as ascertained by the bodies recovered and careful investigation as to the resultant deaths. There were undoubtedly many more who were drowned but their bodies never recovered. For instance, the relief committee of Hamilton, after a careful investigation, estimated that not less than 200 were drowned there and in the immediate vicinity. In Dayton, likewise, there was a large number missing—never accounted for.

Property Loss

The following estimate was made in March, 1914. Quite a number of estimated rates as to losses by public utilities had not yet been received, so that the following figures are less than the total would be. These figures do not include the losses sustained by farms.

Shelby County (includes Sidney)	\$ 212,000
Piqua, approximately	1,000,000
Troy, approximately	600,000
Miami County	525,000
Covington	50,000
Pleasant Hill and West Milton.....	3,000
Germantown and vicinity	50,000
Dayton (exclusive of public utilities, figures for which are not now obtainable)	46,504,200
Montgomery County	700,000
Miamisburg	1,225,000
Franklin and Warren Counties	380,000
Middletown	1,100,000
Immediate vicinity of Middletown	111,000
Hamilton and Butler Counties	9,568,224
Total, cities and counties	62,028,424

MIAMI CONSERVANCY DISTRICT

To the above should be added :

Clark County and Springfield	182,500
Bell Telephone Co. (throughout the valley)	130,000
Home Telephone Co., Dayton.....	125,000
Western Union Telegraph Co., Dayton.....	24,650
Big Four Railroad	1,250,000
Erie Railroad	25,000
Cincinnati, Hamilton & Dayton Railroad, approximately	1,000,000
Pennsylvania Railroad (no figures obtainable).....	
Electric traction lines, approximately	2,000,000

Grand total, as estimated from figures now obtainable

\$66,765,574

Hamilton real estate men say that to their figures may be added an average depreciation of 33 1/3 per cent on \$31,838,420 of taxable real estate in the city, which depreciation will hold until works are provided to insure the city against a repetition of flood disaster. This would amount to \$10,612,806.

Dayton real estate men estimate that Dayton real estate would suffer a permanent depreciation of at least an equal proportion if there were another flood such as that of last March any time within the next few years. This would amount to about \$30,000,000.

Many buildings were entirely destroyed. In Hamilton 200 residences were washed away and carried down river. In Dayton and Hamilton the flood was accompanied by fire and many buildings were burned.

The water of the river during the flood carried a heavy load of silt—a very fine, sticky clay. As the flood waters broke in windows and doors and flowed through buildings, the current was checked inside the rooms, and much of this silt settled to the floor or into cracks. This process continued as long as the flood lasted. As a result every crack and opening in floor, walls, or furniture was filled with a sticky, slimy ooze. On the floors of houses it lay from a few inches to a foot or more deep. Thousands of tons of this material were shoveled out of houses. Wall paper and plastering were ruined, doors warped, and hardwood finishing destroyed. Furniture which did not fall to pieces from being water soaked was impregnated with mud. Hundreds of pianos were hauled to the city dump and burned. Vast quantities of furniture were destroyed in this way or were floated out of stores and houses, and carried away in the current.

Some of the most peculiar effects of high velocity were seen in the tearing up of streets. Large areas of asphalt were peeled off. Tiled floors inside store buildings were torn up and carried away in the same manner. Sewers, gas mains, and water pipes were filled with mud. In some places where the current was swift, streets were washed out many feet deep. Shade trees were uprooted or broken off. In Hamilton a street on the west bank of the river was washed away for several blocks, its location becoming part of the

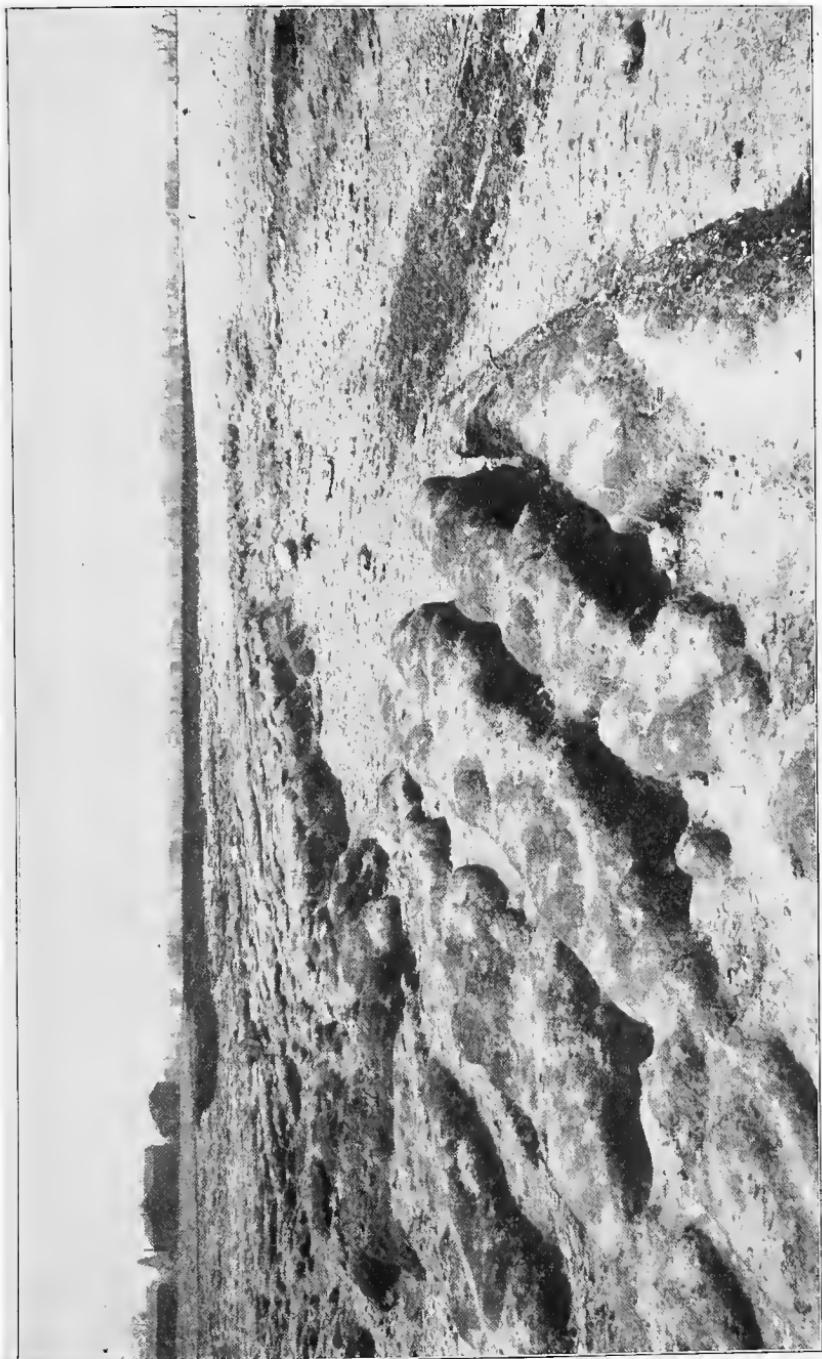


FIG. 41.—FARM LANDS RUINED BY FLOOD.
In many places the top soil was torn off and the land made unproductive. Note how the furrows between corn rows developed into gullies.



FIG. 42.—WHERE A HEDGE OR FENCE CHECKED THE CURRENT, SAND WAS DEPOSITED IN GREAT HEAPS.

river channel, while in the southern part of the city the river tore away buildings and soil covering several blocks on the east bank. Everywhere in the flooded areas gas, water, and light meters were destroyed or damaged. Telephone central stations were flooded and the apparatus soaked with mud. Conduits were ruined, many miles of overhead wires were torn down, and poles were broken off. Railroad grades were washed out and every railroad bridge on a hundred miles of the river was wholly or partially destroyed, and more than half of the highway bridges were likewise taken out.

The flood had most varying effects upon the farm lands of the valley. In some places all of the top soil was torn away from large areas, leaving great beds of gravel exposed. In other situations the top soil was not disturbed, but whole farms were entirely covered with gravel carried out of the river channel by the current. In a few instances where the water had but little current there were deposits of silt and of the top soil carried from other lands, with the result that such lands were increased greatly in fertility. In some cases corn crops since the flood have been fifty per cent greater than they were before. Most of the soil eroded by the swift waters was carried down into the Ohio River, and the total effect of the flood on farm lands was a very great loss.

It is seldom that a great disaster occurs which is entirely without its compensations, and the Miami Valley in some respects is better for its experience. An old settled community tends to conserve things as they are. Life becomes crystallized into fixed forms and habits. Relationships tend to be confined to circumscribed social groups, and things outside those groups are looked upon as foreign to their interests. Property rights become sacred. Great public improvements are almost impossible although people have abundant energy and resources to carry them through, because private interests are so entrenched and selfishness is so respectable, that they cannot be made to give way for the public good. Class cleavage becomes marked, each class through lack of acquaintance, having a cynical disbelief in the ability and integrity of the others. People's attentions become centered on the ways in which their interests are opposed, and great common interests, which in reality make up by far the larger part of life, are forgotten.

A great catastrophe, no matter what its cause, more or less breaks up this crystallization and cleavage, and tends to require that life shall reconstruct itself, and in this reconstruction, instead of returning to the old status, an effort is made to fit the new life to the needs of today, and to bring about the new organization in accordance with new standards. To a considerable extent there is a renaissance. When men who had risked their lives together during the crisis found at its close that they belonged to groups which were enemies, the new respect and friendship lasted, and the old enmity did not entirely return. Mutual respect and common interests overshadowed particular differences. In raising the \$2,000,-000 flood prevention fund in Dayton, capitalist and laborer, Christian and Jew, saloon keeper and minister worked side by side. As

they became acquainted with each other's personalities and motives, there resulted a general improvement in sanity of outlook and in mutual understanding.

The new city government of Dayton, representing a step from the entrenched, conventional system to the most orderly, effective, and progressive form of non-partisan city organization, might have been adopted if there had been no flood, but it is doubtful if it would have been accepted with the same whole-hearted sympathy. The people of the valley, and of Dayton in particular, have come to think of civic interests as demanding a share of every man's time and resources. The uniting of between twenty and thirty relief and charitable organizations into a federation of charities and philanthropy, the merging of several commercial bodies into the Greater Dayton Association, and the united working out of industrial problems by groups of manufacturers, are evidences of a new ability to do team work.

Significant of the desire to make the new conditions better than the old was the experience of some of the furniture dealers of Dayton. In stocking up after the flood some of them confined their purchases largely to cheap furniture, thinking that people after their great losses would buy as cheaply as they could. They found to their surprise an unusual demand for furniture of high quality. For, many people finding that they must refurnish their homes, took the opportunity to get away from makeshifts, and to furnish in accordance with their tastes.

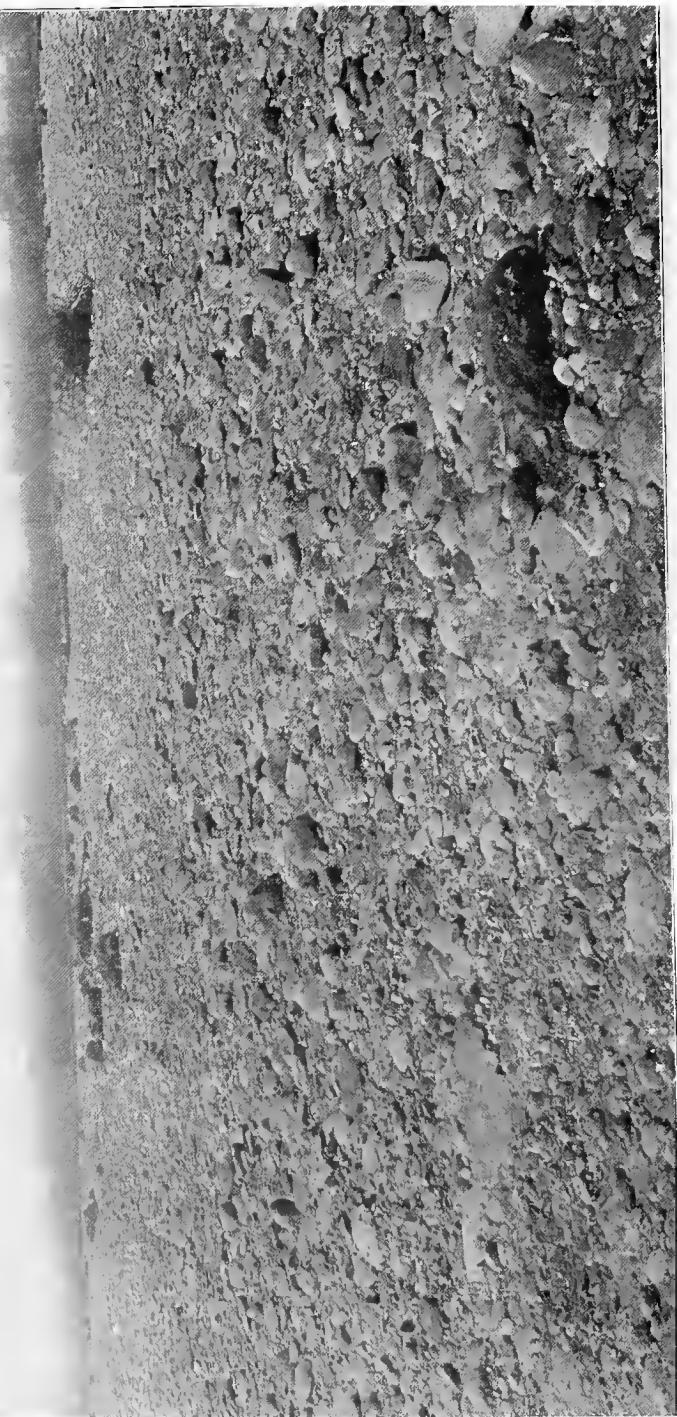
The flood brought together many people who never would have met so long as they remained within the small limits of their usual social environment. Conventionalities were inopportune and acquaintances were easily made. As one result of this condition there were an unusual number of marriages during the following months. While exposure and privation broke down the health of many people, there were instances of a contrary effect. For instance, one woman who had considered herself an almost helpless invalid for many years, was thrown upon her own resources and has gone about her affairs in good health ever since.

'It might seem that the raising of a subscription of \$2,150,000 from a community which had just gone through a terrible experience would have dried up the sources of contributions for a long time to come, but exactly the reverse seems to have been true. Far more money and time has been given for public interests since the flood than during any similar period before. It seems that the contributions of people to the civic interests of a community usually are limited not by their resources, but by their interest and their habits. The people of the Miami Valley learned through the flood to do effective team work and to share their resources in furthering common interests. They came to expect to find themselves hopefully and courageously facing new issues with confidence of success. While absence of friction between the cities of the valley did not entirely cease, yet the period since the flood has seen the development of a remarkable spirit of mutual respect and good will,



FIG. 43.—GREAT BANKS OF GRAVEL WERE DEPOSITED OVER FARM LANDS.

FIG. 44.—ENTIRE FARMS WERE SO COVERED WITH GRAVEL AS TO BE USELESS.



and a desire to work out common problems for the valley as a whole with a unity of purpose.

Favorable reactions such as these do not necessarily follow a public calamity.. Unfortunately, there are instances of cities that suffered greatly during the 1913 flood in which no effective reaction has taken place, but where the public resources of time and energy have been consumed in impotent bickering, and where the community not only is no nearer real protection than in 1913, but where united community action seems more remote than ever.

